

Kansas State Agricultural College

CATALOGUE

FIFTIETH SESSION

1912-1913



ANNOUNCEMENTS

1913-1914

MANHATTAN.

THE KANSAS INDUSTRIALIST, VOL. XXXIX, No. 40.

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Act of July 16, 1894.

5085

The Board of Administration¹

HON. ED. T. HACKNEY, *President*..... Term expires 1917.
Wellington, Sumner county.
HON. E. W. HOCH..... Term expires 1915.
Marion, Marion county.
HON. (MRS.) CORA G. LEWIS..... Term expires 1917.
Kinsley, Edwards county.

D. M. BOWEN, *Secretary*,
Pittsburg, Crawford county.

The Board of Regents²

HON. EDWIN TAYLOR, Edwardsville, Wyandotte county.	HON. ABE GILTNER, JR., ³ Wamego, Pottawatomie county.
HON. W. E. BLACKBURN, Anthony, Harper county.	HON. ARTHUR CAPPER, ⁴ Topeka, Shawnee county.
HON. A. J. MORRIS, ³ Hill City, Graham county.	HON. A. L. SPONSLER, ⁴ Hutchinson, Reno county.
HON. WILLIAM A. PRICE, ³ Madison, Greenwood county.	HON. M. M. SHERMAN, ⁴ Ellsworth, Ellsworth county.
HON. C. W. CARSON, ³ Ashland, Clark county.	HON. A. T. PALMER, ⁴ Wamego, Pottawatomie county.

PRES. H. J. WATERS (*ex officio*), *Secretary*,
Manhattan, Riley county.

MARGARET BUTTERFIELD, *Assistant Secretary*.

1. From March 20, 1913, in respect to the work for 1913-'14 and announcements thereof, and with full power from July 1, 1913.
2. Until July 1, 1913.
3. Beginning March, 1913.
4. Until March, 1913.

Administrative Officers

President	HENRY JACKSON WATERS.
Dean of the Division of Agriculture and Director of the Agricultural Experiment Station	WILLIAM M JARDINE.
Dean of the Division of Mechanic Arts and Director of the Engineering Experiment Station	E. B. McCORMICK.
Dean of the Division of General Science ..	J. T. WILLARD.
Dean of the Division of Home Economics ..	MRS. MARY P. VAN ZILE.
Dean of the College	CLARK M. BRINK.
Dean of the Division of College Extension,	J. H. MILLER.
Secretary	MISS MARGARET BUTTERFIELD.
Financial Secretary	J. C. CHRISTENSEN.
Librarian	ARTHUR B. SMITH.

1913.							1914.							1915.						
JULY.							JANUARY.							JULY.						
S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S
..	..	1	2	3	4	5	..	..	..	1	2	3	..	..	..	1	2	3	4	..
6	7	8	9	10	11	12	4	5	6	7	8	9	10	5	6	7	8	9	10	11
13	14	15	16	17	18	19	11	12	13	14	15	16	17	12	13	14	15	16	17	18
20	21	22	23	24	25	26	18	19	20	21	22	23	24	19	20	21	22	23	24	25
27	28	29	30	31	..	..	25	26	27	28	29	30	31	26	27	28	29	30	31	..
..
AUGUST.							FEBRUARY.							AUGUST.						
..	..	..	..	..	1	2	1	2	3	4	5	6	7	..	..	..	..	..	..	1
3	4	5	6	7	8	9	8	9	10	11	12	13	14	2	3	4	5	6	7	8
10	11	12	13	14	15	16	15	16	17	18	19	20	21	9	10	11	12	13	14	15
17	18	19	20	21	22	23	22	23	24	25	26	27	28	16	17	18	19	20	21	22
24	25	26	27	28	29	30	..	..	..	..	..	..	..	23	24	25	26	27	28	29
31	..	..	..	..	..	..	..	..	..	..	..	..	..	30	31	..	..	..	..	..
SEPTEMBER.							MARCH.							SEPTEMBER.						
..	1	2	3	4	5	6	1	2	3	4	5	6	7	..	..	1	2	3	4	5
7	8	9	10	11	12	13	8	9	10	11	12	13	14	6	7	8	9	10	11	12
14	15	16	17	18	19	20	15	16	17	18	19	20	21	13	14	15	16	17	18	19
21	22	23	24	25	26	27	22	23	24	25	26	27	28	20	21	22	23	24	25	26
28	29	30	..	..	..	..	29	30	31	..	..	..	..	27	28	29	30	..	..	..
OCTOBER.							APRIL.							OCTOBER.						
..	..	1	2	3	4	5	..	..	1	2	3	4	5	..	..	..	1	2	3	4
5	6	7	8	9	10	11	5	6	7	8	9	10	11	4	5	6	7	8	9	10
12	13	14	15	16	17	18	12	13	14	15	16	17	18	11	12	13	14	15	16	17
19	20	21	22	23	24	25	19	20	21	22	23	24	25	18	19	20	21	22	23	24
26	27	28	29	30	31	..	26	27	28	29	30	..	..	25	26	27	28	29	30	31
NOVEMBER.							MAY.							NOVEMBER.						
..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	2	3	4	5	6	7
2	3	4	5	6	7	8	3	4	5	6	7	8	9	8	9	10	11	12	13	14
9	10	11	12	13	14	15	10	11	12	13	14	15	16	15	16	17	18	19	20	21
16	17	18	19	20	21	22	17	18	19	20	21	22	23	22	23	24	25	26	27	28
23	24	25	26	27	28	29	24	25	26	27	28	29	30	29	30	..	..	..	..	..
30	..	..	..	..	..	..	31	..	..	..	..	..	..	..	..	..	..	..	..	..
DECEMBER.							JUNE.							DECEMBER.						
..	1	2	3	4	5	6	..	1	2	3	4	5	6	..	..	1	2	3	4	5
7	8	9	10	11	12	13	7	8	9	10	11	12	13	6	7	8	9	10	11	12
14	15	16	17	18	19	20	14	15	16	17	18	19	20	13	14	15	16	17	18	19
21	22	23	24	25	26	27	21	22	23	24	25	26	27	20	21	22	23	24	25	26
28	29	30	31	..	..	..	28	29	30	..	..	..	..	27	28	29	30	31	..	..

The College Calendar

1913.

SEPT. 15, Monday.—Faculty meeting at nine A. M.
SEPT. 15, Monday.—Meeting of assigners at ten A. M.
SEPT. 15, Monday.—Assignment of students begins at one-thirty P. M.
SEPT. 16, Tuesday.—Admission of new students at nine A. M.
SEPT. 18, Thursday.—Assignment of students closes at five P. M.
SEPT. 18, Thursday.—Short course for housekeepers begins
SEPT. 19, Friday.—All classes meet according to schedule
SEPT. 19, Friday.—Opening convocation at ten A. M.
OCT. 11, Saturday.—Scholarship deficiency reports due
NOV. 1, Saturday.—Scholarship deficiency reports due
NOV. 27 to 29, Thursday to Saturday.—Thanksgiving vacation
DEC. 6, Saturday.—Examinations to remove conditions
DEC. 12 to 19, Friday to Friday.—Examinations at close of term
DEC. 19, Friday.—Fall term closes at eleven A. M.
DEC. 15, Monday.—Assignment of students for winter term begins at nine A. M.

1914.

JAN. 5, Monday.—Admission of new students at nine A. M.
JAN. 6, Tuesday.—Assignment of students closes at five P. M.
JAN. 6, Tuesday.—Short courses in agriculture and dairying begin
JAN. 7, Wednesday.—All classes meet according to schedule
JAN. 31, Saturday.—Scholarship deficiency reports due
FEB. 20, Friday.—Scholarship deficiency reports due
MAR. 14, Saturday.—Examinations to remove conditions
MAR. 18, Wednesday.—Short courses in agriculture and dairying close
MAR. 20 to 27, Friday to Friday.—Examinations at close of term
MAR. 27, Friday.—Winter term closes at eleven A. M.
MAR. 23, Monday.—Assignment of students for the spring term begins at nine A. M.

MAR. 30, Monday.—Admission of new students at nine A. M.
MAR. 31, Tuesday.—Assignment of students closes at five P. M.
APR. 1, Wednesday.—All classes meet according to schedule
APR. 18, Saturday.—Scholarship deficiency reports due
MAY 9, Saturday.—Scholarship deficiency reports due
MAY 30, Saturday.—Holiday, Decoration Day
JUNE 6, Saturday.—Examinations to remove conditions
JUNE 10 to 17, Wednesday to Wednesday.—Examinations at close of term
JUNE 14 to 18, Sunday to Thursday.—Exercises of Commencement Week
JUNE 18 to July 30, Thursday to Thursday.—Summer School in session

SEPT. 14, Monday.—Assignment of students begins at one-thirty P. M.
SEPT. 17, Thursday.—Assignment of students closes
SEPT. 18, Friday.—All classes meet according to schedule

Students must be present the very first day of each term or render a reasonable excuse. Failure to take out an assignment is not accepted as an excuse for absence from classes.

The Board of Instruction

HENRY JACKSON WATERS, B. S. A., LL. D.,

President of the College.

B. S. A., University of Missouri, 1886; Assistant Secretary, Missouri State Board of Agriculture, 1886-1888; Assistant in Agriculture to Missouri Experiment Station, 1888-1891; Professor of Agriculture, Pennsylvania State College, and Agriculturist, Pennsylvania Experiment Station, 1892-1895; Instructor in Animal Nutrition, Graduate School of Agriculture, University of Ohio, 1902; Director Missouri State Agricultural Exhibit, World's Fair, St. Louis, 1903-1904; Student at the Universities of Leipzig and Zurich, 1904-1905; Instructor in Animal Nutrition, Graduate School of Agriculture, University of Illinois, 1906; President Missouri State Board of Agriculture, 1908-1909; Dean of the College of Agriculture, Director of the Experiment Station, and Professor of Agriculture, University of Missouri, 1895-1909; President, Kansas State Teachers' Association, 1911-1912; LL. D., New Hampshire State College, 1913; President, Kansas State Agricultural College, 1909—.

Office* A 30; Res. 500 Houston St.

JOHN DANIEL WALTERS, D. A.,

Professor of Architecture and Drawing.

Student, High School, Bucheggberg, Switzerland, 1860-1863; Student, College of Solothurn, Switzerland, 1863-1867; Instructor, Agricultural Experiment Station, Klingenberg, Switzerland, 1865-1866; Student, University of Bern, 1868; Instructor in Industrial Art, Kansas State Agricultural College, 1876-1885; M. S., *ibid.*, 1883; Professor of Industrial Art and Design, *ibid.*, 1885-1904; D. A., *ibid.*, 1908; Professor of Architecture and Drawing, *ibid.*, 1904—.

Office E 56; Res. 508 Bluemont Ave.

JULIUS TERRASS WILLARD, D. Sc.,

Dean of the Division of General Science, Chemist of the Experiment Stations, Professor of Chemistry.

B. S., Kansas State Agricultural College, 1883; Assistant in Chemistry, *ibid.*, 1883-1887; M. S., *ibid.*, 1886; Graduate Student, Johns Hopkins University, 1887-1888; Assistant Chemist, Kansas Experiment Station, 1888-1897; Assistant Professor of Chemistry, Kansas State Agricultural College, 1890-1896; Associate Professor of Chemistry, *ibid.*, 1896-1897; Chemist, Kansas Experiment Station, 1897—; Professor of Applied Chemistry, Kansas State Agricultural College, 1897-1901; Director, Kansas Experiment Station, 1900-1906; Vice Director, *ibid.*, 1907—; Professor of Chemistry, Kansas State Agricultural College, 1901—; D. Sc., *ibid.*, 1908; Dean of the Division of General Science, *ibid.*, 1909—; Chemist, Engineering Experiment Station, *ibid.*, 1910—.

Office C 30; Res. 1725 Poyntz Ave.

JOSHUA DOUGLAS RICKMAN,⁵

Superintendent of Printing.

Master Printer, Newton, Iowa, 1876; in printing trade, 1876-1898; Foreman Department of Printing, Kansas State Agricultural College, 1898-1899; Superintendent of Printing, *ibid.*, 1899-November 1, 1912.

* Buildings are designated by letters, as follows:

A—Anderson Hall (Main).	L—Domestic Science and Art Hall.
Ag—Agricultural Hall.	M—Auditorium.
C—Denison Hall.	N—Nichols Gymnasium.
D—Dairy Hall.	R—Farm Mechanics Hall (Old Armory).
E—Mechanical Engineering Hall.	S—Engineering Shops.
F—Fairchild Hall (Library).	V—Veterinary Hall.
G—Agricultural Hall (Old).	W—Chemistry Annex.
H—Horticultural Hall.	X—Horticultural Laboratory.
K—Kedzie Hall (Printing).	

5. Resigned.

BENJAMIN LUCE REMICK, PH. M.,
Professor of Mathematics.

Ph. B., Cornell College (Iowa), 1889; Instructor, Cornell College Academy, 1889-1892; Ph. M., Cornell College, 1892; Graduate Student, Johns Hopkins University, 1892-1893; Instructor, Northwestern University Academy, 1893-1894; Graduate Student, University of Chicago, 1894-1895; Professor of Mathematics, University of Pacific, 1895-1896; Graduate Student, University of Chicago, 1896-1898; Associate, Bradley Institute (Peoria, Illinois), 1898-1900; Professor of Mathematics, Kansas State Agricultural College, 1900—.
 Office A 71; Res. 613 Houston St.

BENJAMIN FRANKLIN EYER,⁵ E. E.,
Professor of Electrical Engineering.

Professor of Physics, Hiawatha Academy, 1890-1895; Student, University of Chicago, Summers, 1893, 1898, 1901; Instructor in Physics and Chemistry, Topeka High School, 1895-1900; Vice Principal of Topeka High School, 1897-1900; Professor of Physics and Electrical Engineering, Kansas State Agricultural College, 1900-1908; on leave of absence, 1901-1902; B. S., Armour Institute of Technology, 1902; E. E., *ibid.*, 1903; Professor of Electrical Engineering, Kansas State Agricultural College, 1908-January 1, 1913.

HERBERT FULLER ROBERTS, M. S.,
Professor of Botany.

A. B., University of Kansas, 1891; LL. B., Northwestern University Law School (Chicago), 1893; Admission to the Bar, Supreme Court of Illinois, 1893; Assistant in Law Offices, Kansas City, Missouri, 1893-1894; Graduate Student in Biology, Kansas State Agricultural College, 1896-1898; M. S., *ibid.*, 1898; Graduate Student, University of Chicago, 1898-1899; Instructor in Botany, Washington University (St. Louis), 1899-1901; Professor of Botany, Kansas State Agricultural College, 1901—.
 Office H 58; Res. 1920 Poyntz Ave.

WILLIAM ARCH MCKEEVER, PH. M.,
Professor of Philosophy.

B. A., Campbell College, 1893; Principal, Holton Schools, 1894-1896; A. M., University of Kansas, 1898; Superintendent, Smith Center Public Schools, 1898-1900; Assistant Professor of English and Philosophy, Kansas State Agricultural College, 1900-1901; Professor of Philosophy, *ibid.*, 1901—; Ph. M., University of Chicago, 1904; Graduate Student, Harvard University Summer School, 1904.
 Office N 27; Res. 341 N. Fourteenth St.

EDMUND BURKE MCCORMICK, S. B.,
Dean of the Division of Mechanic Arts, Director of Engineering Experiment Station, Professor of Power and Experimental Engineering.

Machinist with Chicago and Alton Railroad Company, 1889-1893; S. B. in Mechanical Engineering, Massachusetts Institute of Technology, 1897; Instructor in Mechanical Engineering, Montana State College, 1898-1899; Assistant Professor of Mechanical Engineering, *ibid.*, 1899-1901; Professor of Mechanical Engineering, Kansas State Agricultural College, 1901-1910; Consulting Engineer, United States Office of Public Roads, 1907—; Dean of the Division of Mechanic Arts, Kansas State Agricultural College, 1908—; Director of Engineering Experiment Station and Professor of Power and Experimental Engineering, *ibid.*, 1910—.
 Office E 30; Res. 800 Houston St.

ALBERT DICKENS, M. S.,
Professor of Horticulture.

B. S., Kansas State Agricultural College, 1893; Foreman, Munger Orchards, Eureka, 1895; State Teacher's Certificate, 1895; Instructor, Ellinwood High School, 1897-1898; Teacher's Life Certificate, 1898; Assistant in Horticulture, Kansas State Agricultural College, 1899-1901; M. S., *ibid.*, 1901; Acting Professor of Horticulture, *ibid.*, 1901-1902; Professor of Horticulture, *ibid.*, 1902—.
 Office H 30; Res. 509 N. Manhattan Ave.

5. Resigned.

CLARK MILLS BRINK, PH. D.,
Dean of the College, Assistant to the President, Professor of English Literature.

A. B., University of Rochester, 1879; Graduate, Rochester Theological Seminary, 1882; Pastor, First Baptist Church, Des Moines, Iowa, 1882-1887; Fellow and Graduate Student, New York University, 1888-1892; Instructor in Rhetoric and Oratory, Brown University, 1892-1895; A. M., University of Rochester, 1893; Ph. D., New York University, 1894; Professor of English and History, Kalamazoo College, 1895-1901; Graduate Student, University of Chicago, Summer, 1900; Graduate Student, Harvard University, 1901-1902; Professor of English, Kansas State Agricultural College, 1902-1911; Assistant to the President, *ibid.*, 1908—; Dean of Science, *ibid.*, 1908-1909; Dean of the College, *ibid.*, 1909—; Professor of English Literature, *ibid.*, 1911—.
Office A 61; Res. 9 Park Road.

RALPH RAY PRICE, A. M.,
Professor of History and Civics.

A. B., Baker University, 1896; Graduate Student, University of Kansas, 1896-1898; A. M., *ibid.*, 1898; Assistant in History, *ibid.*, 1897-1900; Graduate Student, University of Chicago, Summer, 1899; Instructor in History and Civics, Lawrence High School, 1898-1901; Graduate Student, University of Wisconsin, Summer, 1901; Instructor in History and Civics, Ishpeming (Michigan) High School, 1901-1902; Graduate Student, Cornell University, Summer, 1902; Instructor in History and Civics, and Assistant Principal, Rockford (Illinois) High School, 1902-1908; Graduate Student, University of Michigan Law School, Summer, 1909; Professor of American History and Government, University of Kansas, Summer, 1911; Professor of History and Civics, Kansas State Agricultural College, 1903—.
Office F 57; Res. 826 Houston St.

JULIUS ERNEST KAMMEYER, A. M., LL. D.,
Professor of Economics.

A. B., Central Wesleyan College, 1886; Instructor, Public Schools, 1886-1898; A. M., Central Wesleyan College, 1889; Instructor in History and Civics, Kansas City (Kansas) High School, 1893-1897; Vice Principal and Instructor in Economics, *ibid.*, 1897-1903; Professor of Oratory, Kansas State Agricultural College, 1903-1904; Graduate Student, University of Chicago, Summer, 1910; LL. D., Kansas City University, 1912; Professor of Economics, Kansas State Agricultural College, 1904—.
Office A 52; Res. 901 Belmont Ave.

JOHN VANZANDT CORTELYOU, PH. D.,
Professor of German.

A. B., University of Nebraska, 1897; Assistant Principal, Humboldt (Nebraska) High School, 1897-1898; Principal, *ibid.*, 1898-1899; A. M., University of Nebraska, 1901; Graduate Student, University of Heidelberg, Germany, 1901-1904; Research Work, British Museum and Bibliotheque Nationale (Paris), Summer, 1903; Ph. D., University of Heidelberg, 1904; Professor of German, Kansas State Agricultural College, 1904—.
Office N 59; Res. 5 Park Road.

OLOF VALLEY, B. M.,
Professor of Music.

Student, Teknologiska Institutet, Stockholm, Sweden, 1886-1888; Engineering Professor, Chicago, 1888-1892; Pupil of Signor Carpi, 1892-1893, Albert B. Ruff, 1893-1897; Soloist with American Union Swish Singers on European Concert Tour, 1897; Pupil of William Nelson Burritt, 1898-1900; Concert and Oratorio Artist, 1900—; Pupil of Max Heinrich, 1900-1901; B. M., Chicago Conservatory of Music, 1902; Instructor and Concert Artist, *ibid.*, 1903-1904; Professor of Music, Kansas State Agricultural College, 1904—.
Office M 30; Res. 225 N. Fourteenth St.

FRANCIS SIEGEL SCHOENLEBER, D. V. S.,
Professor of Veterinary Medicine.

B. S. A., Iowa State College, 1885; Assistant in Agriculture, *ibid.*, 1885-1888; M. S. A., *ibid.*, 1887; Associate Editor, *Orange Judd Farmer*, Chicago, 1888-1890; D. V. S., Chicago Veterinary College, 1890; Private Veterinary Practice, 1890-1896; Dean, McKillip Veterinary College, Chicago, 1896-1899, and 1901-1905; M. D., Harvey Medical College, Chicago, 1901; M. D., National Medical University, Chicago, 1901; Private Human Practice, 1901-1903; Professor of Veterinary Medicine, Kansas State Agricultural College, 1905—.
Office V 30; Res. 603 Houston St.

JOHN HAROLD MILLER, A. M.,

Dean of the Division of College Extension.

A. B., Central Normal College (Danville, Indiana), 1882; President, Campbell College, 1882-1888; with D. C. Heath and Company, 1888-1890; Publisher *Northwestern Monthly*, Lincoln, Nebraska, 1890-1900; Principal State Normal School, Cheney, Washington, 1900-1902; Editor and Publisher, Holton (Kansas) *Tribune*, 1902-1905; Superintendent of Agricultural Extension, Kansas State Agricultural College, 1905-1911; Director of College Extension, *ibid.*, 1911-1912; Dean of the Division of College Extension, *ibid.*, 1912-
Office A 36; Res. 1604 Leavenworth St.

THOMAS J HEADLEE,⁵ PH. D.,*Professor of Entomology and Zoölogy.*

A. B., University of Indiana, 1902; A. M., *ibid.*, 1903; Graduate Student in Entomology, Cornell University, 1904-1906; Scholar in Entomology, *ibid.*, 1905-1906; Ph. D., *ibid.*, 1906; Assistant Entomologist, New Hampshire Agricultural Experiment Station, 1906-1907; Associate Entomologist, *ibid.*, 1907; Professor of Entomology and Zoölogy, Kansas State Agricultural College, 1907-October 1, 1912.

JOHN ORR HAMILTON, B. S.,

Professor of Physics, in Charge of Electrical Engineering.

Student, Monmouth College, 1888-1890; Superintendent, Roseville (Illinois) Public Schools, 1894-1898; B. S., University of Chicago, 1900; Instructor in Science, Mount Barbara Military Academy (Salina), 1900-1901; Assistant in Physics, Kansas State Agricultural College, 1901-1903; Assistant Professor of Physics, *ibid.*, 1903-1908; Professor of Physics, *ibid.*, 1908-; in Charge of Electrical Engineering, *ibid.*, January 1, 1913-
Office C 57; Res. 6 Park Road.

MARY PIERCE VAN ZILE,

Dean of the Division of Home Economics, Professor of Domestic Science.

Instructor, Winfield (Iowa) Schools, 1888-1889; Student, Kansas State Agricultural College, 1889-1891; Principal, Wayland (Iowa) High School, 1891-1892; Teacher's Diploma, Iowa State College, 1902; Instructor in Domestic Science, *ibid.*, 1902-1903; Student, Graduate School of Domestic Science, University of Illinois, Summer, 1903; Domestic Science Lecturer and Demonstrator at Chautauquas, Summers of 1903-1905; Instructor in Domestic Science and Art, Township High School, Chicago, 1903-1908; Professor of Domestic Science, Kansas State Agricultural College, 1908-; Dean of Women, *ibid.*, 1908-1913; Dean of the Division of Home Economics, 1913-
Offices L 29 and 30; Res. 1322 Fremont St.

EDWIN HARRISON WEBSTER,⁵ M. S.,*Director of Agricultural Experiment Station, Dean of the Division of Agriculture.*

B. S., Kansas State Agricultural College, 1896; Student, Sedalia (Missouri) Central Business College, 1896; Instructor, Private School for Boys, Denver, 1896-1897; Machinist, Aermotor Company, Chicago, 1898; Graduate Student, Kansas State Agricultural College, 1899-1900; Assistant in Dairying, Iowa State College, 1900-1901; B. S. Agr., *ibid.*, 1901; M. S., Kansas State Agricultural College, 1901; Assistant Professor of Dairying, *ibid.*, 1901-1902; Professor of Dairying, *ibid.*, 1902-1903; Scientific Expert in Dairying, United States Department of Agriculture, 1903-1904; General Superintendent, Beatrice Creamery Company, Denver, 1904-1905; Chief of Dairy Division, United States Department of Agriculture, 1905-1908; Dean of the Division of Agriculture and Director of Agricultural Experiment Station, Kansas State Agricultural College, 1908-January 1, 1913.

LOWELL EDWIN CONRAD, M. S.,

Professor of Civil Engineering.

Chairman, Union Pacific Railroad Company, 1899; Chairman, Illinois Central Railroad Company, 1900; Levelman, Vicksburg National Military Park, 1900-1901; Field Draftsman, Choctaw, Oklahoma and Gulf Railroad Company, 1901; Instrument Man, Mexican Central Railway Company, 1902-1903; B. S., Cornell College (Iowa), 1904; Inspector and Instrument Man on Sewer Construction, Centralia, Illinois, 1904; Assistant Engineer on Construction, Gulf Terminus of the Tehuantepec National Railway Route, Mexico, 1905-1906; C. E., Cornell College (Iowa), 1906; Instructor and Graduate Student in Civil Engineering, Lehigh University, 1906-1908; M. S., *ibid.*, 1908; Assistant Professor of Civil Engineering, Kansas State Agricultural College, 1908-1909; Professor of Civil Engineering, *ibid.*, 1909-
Office E 31; Res. 317 N. Seventeenth St.

5. Resigned.

CHARLES ANDERSON SCOTT, B. S.,

Kansas State Forester.

B. S., Kansas State Agricultural College, 1901; Forest Expert, United States Forest Service, 1901-1904; Graduate Student, Yale University Forest School, 1904-1905; Forest Supervisor, United States Forest Service, 1905-1907; Special Lecturer on Forestry Subjects, University of Nebraska, Winters, 1906 and 1907; Professor of Forestry, Iowa State College, 1908-1910; Kansas State Forester, Kansas State Agricultural College, 1910—. Office H 28; Res. 311 N. Eighteenth St.

LESLIE ARTHUR FITZ, B. S.,

Professor of Milling Industry.

B. S., Kansas State Agricultural College, 1902; Grain Investigation, United States Department of Agriculture, 1902-1906; Office of Grain Standardization, *ibid.*, 1906-1910; in Charge of Department of Milling Industry, Kansas State Agricultural College, 1910-1912; Professor of Milling Industry, *ibid.*, 1912—. Office Ag 115; Res. 1014 Houston St.

EDWIN LEE HOLTON, A. B.,

Professor of Rural Education.

Graduate, Indiana State Normal School, 1900; Principal, Township Consolidated Schools, Madison County, Indiana, 1900-1902; A. B., University of Indiana, 1904; Graduate Student, *ibid.*, Winter and Spring Terms, 1904; Superintendent City Schools, Holton, Kansas, 1904-1906; Superintendent City Schools, Noblesville, Indiana, 1906-1908; Graduate Student, Columbia University, 1908-1910; Supervisor Industrial Schools, New York City, 1909-1910; Professor of Rural Education, Kansas State Agricultural College, 1910—. Office A 32; Res. 221 N. Fourteenth St.

ANDREY ABRAHAM POTTER, S. B.,

Professor of Steam and Gas Engineering; in Charge of Course in Mechanical Engineering.

S. B., Massachusetts Institute of Technology, 1903; Engineer in Experimental Steam Turbine Department, General Electric Company, 1903-1905; Graduate Student, Columbia University, Summer Session, 1908; Assistant Professor of Mechanical Engineering, Kansas State Agricultural College, 1905-1910; Professor of Steam and Gas Engineering, *ibid.*, 1910—. Office S 55; Res. 1332 Fremont St.

ROY ANDREW SEATON, M. S.,

Professor of Applied Mechanics and Hydraulics.

B. S., Kansas State Agricultural College, 1904; Assistant in Mathematics, *ibid.*, 1904-1906; Assistant Professor, *ibid.*, 1907-1908; Graduate Student, University of Wisconsin, Summer Session, 1908; Instructor in Mechanical Engineering, Kansas State Agricultural College, 1908-1909; Assistant Professor of Mechanical Engineering, *ibid.*, 1909-1910; M. S., *ibid.*, 1910; Graduate Student, Massachusetts Institute of Technology, 1910-1911; S. B., *ibid.*, 1911; in Turbine Drafting Department, General Electric Company, Lynn, Mass., 1911-1912; Professor of Applied Mechanics and Hydraulics, Kansas State Agricultural College, 1910—. Office S 63; Res. 731 Leavenworth St.

WILLIAM M JARDINE, B. S. A.,

Dean of the Division of Agriculture, Director of the Agricultural Experiment Station.⁶

B. S. A., Utah Agricultural College, 1904; Instructor in Agronomy, *ibid.*, 1904-1905; Manager, Utah Arid Farming Company, Utah, 1905; Assistant Professor of Agronomy, Utah Agricultural College, 1905; Student, Graduate School of Agriculture, University of Illinois, 1906; Professor of Agronomy, Utah Agricultural College, 1906-1907; Assistant Cerealist, United States Department of Agriculture, 1907-1910; Professor of Agronomy, Kansas State Agricultural College, 1910-1913; Instructor in Field Crops, Graduate School of Agriculture, Michigan Agricultural College, 1912; Acting Dean of the Division of Agriculture and Acting Director of the Agricultural Experiment Station, *ibid.*, January 1-September 1, 1913; Dean of the Division of Agriculture and Director of the Agricultural Experiment Station, *ibid.*, September 1, 1913—. Office Ag 104; Res. 1020 Houston St.

6. Effective September 1, 1913.

CHARLES JAMES DILLON,⁵

Professor of Industrial Journalism.

Special Correspondent in Mexico for the *St. Louis Globe-Democrat*, 1887-1888; Correspondent for the *Tacoma Ledger*, Session of the Legislature, Olympia, Washington, 1889; Roving Commissions and Syndicate Writing, British Northwest Territories, 1890-1892; with the *Chicago Post*, World's Fair Grounds, 1893; Editor the Associated Press, Chicago, 1894; with the *San Francisco Examiner*, 1895; with the Honolulu *Advertiser*, 1896; Roving Commissions through the South Seas to Japan, China, and Vladivostok, 1897-1898; with *The Kansas City Star*, 1899-1910; Professor of Industrial Journalism, Kansas State Agricultural College, 1910-1918.

JAMES WILLIAM SEARSON, A. M.,

Professor of the English Language.

Principal, Weeping Water (Nebraska) High School, 1894-1895; Instructor, Nebraska Teachers' Institutes, 1895-; A. B., University of Nebraska, 1896; Fellow in History, *ibid.*, 1896-1898; A. M., *ibid.*, 1899; Superintendent, Wahoo (Nebraska) Schools, 1899-1905; Professor of English and Rhetoric, Nebraska State Normal School (Peru), 1905-1910; Associate Professor of English, Kansas State Agricultural College, 1910-1911; Professor of the English Language, *ibid.*, 1911-.

Office K 27; Res. 1320 Fremont St.

OLLIE EZEKIEL REED, M. S.,

Professor of Dairy Husbandry.

B. S., College of Agriculture, University of Missouri, 1908; Assistant in Dairy Husbandry, *ibid.*, 1908-1909; Instructor in Milk Production, Purdue University, 1909-1910; M. S., University of Missouri, 1910; Assistant Professor in Charge of Department of Dairy Husbandry, Kansas State Agricultural College, 1910-1911; Professor of Dairy Husbandry, *ibid.*, 1911-.

Office D 30; Res. 1221 Laramie St.

GUY SUMNER LOWMAN, B. P. E.,

Professor of Physical Education, Director of Physical Training.

B. Di., Iowa State Normal School, 1903; B. P. E., International School of Physical Training, Springfield, Massachusetts, 1905; Director of Physical Training, Brookline (Massachusetts) High School, 1905-1907; Graduate Student, Harvard Summer School of Physical Education, Summer, 1907; Director of Physical Education, Warrensburg (Missouri) State Normal School, 1907-1908; Instructor in Physical Education, University of Missouri, 1908-1910; Professor of Physical Training and Director of Athletics, University of Alabama, 1910-1911; Professor of Physical Education and Director of Physical Training, Kansas State Agricultural College, 1911-.

Office N 37; Res. 4 Park Road.

ARTHUR BOURNE SMITH, B. L. S.,

Librarian.

Librarian in Charge, Genesee Wesleyan Seminary, New York, 1892-1895; Principal, Smithboro (New York) Public Schools, 1895-1896; Assistant in Library, Wesleyan University, 1896-1900; Ph. B., Wesleyan University, 1900; Library Assistant, University of Illinois, 1900-1902; B. L. S., *ibid.*, 1902; Assistant Editor, *Cumulative Book Index United States Catalogue, and Readers' Guide to Periodical Literature*, June-September, 1902; Lecturer on Bibliography, University of California, 1903; Head of Order Department of Library, *ibid.*, 1903-June, 1911; Head of Accessions Division of Library, *ibid.*, July-August, 1911; Instructor in Summer School, *ibid.*, 1906 and 1907; Librarian, Kansas State Agricultural College, 1911-.

Office F 32; Res. 1020 Poyntz Ave.

WILLIAM ADAMS LIPPINCOTT, B. S.,

Professor of Poultry Husbandry.

A. B., Illinois College, 1903; Secretary, Young Men's Christian Association, Chicago, 1903-1904; Student, Chicago Theological Seminary, 1904-1906; Poultry Farming, 1906; Graduate Student, Cornell University, 1906-1907; Superintendent of Poultry Farm, Iowa State College, 1907-1908; Student Assistant in Poultry, *ibid.*, 1908-1910; Student, Graduate School of Agriculture, Ames, Iowa, Summer, 1910; Assistant in Charge of Poultry, Iowa State College, 1910-1911; B. S., *ibid.*, 1911; Assistant Professor of Animal Husbandry in Charge of Poultry, *ibid.*, 1911; Professor of Poultry Husbandry, Kansas State Agricultural College, 1912-.

Office Ag 101; Res. 710 Humboldt St.

5. Resigned.

WILBUR ANDREW COCHEL, B. S.,
Professor of Animal Husbandry.

A. B., University of Missouri, 1897; Assistant in Agronomy Department, St. Louis World's Fair, 1903; in Charge of Holsteins in Dairy Test, *ibid.*, 1904; B. S., University of Missouri, 1905; Fellow in Animal Husbandry, *ibid.*, 1905-1906; Assistant in Animal Husbandry, Purdue University, 1906-1907; Associate in Animal Husbandry, *ibid.*, 1907-1909; Professor of Animal Husbandry, Pennsylvania State College, 1909-1912; Professor of Animal Husbandry, Kansas State Agricultural College, 1912—. Office Ag 4; Res. 209 N. Fourteenth St.

LELAND DAVID BUSHNELL, B. S.,
Professor of Bacteriology.

B. S., Michigan Agricultural College, 1905; Assistant in Bacteriology, *ibid.*, 1906-1907; Expert in Dairy Bacteriology, Bureau of Animal Industry, University of Wisconsin, 1908-1909; Assistant in Bacteriology, Kansas State Agricultural College, 1909-1910; Instructor in Bacteriology, *ibid.*, 1910-1911; Assistant Professor in Charge of Department of Bacteriology, *ibid.*, 1911-1912; Professor of Bacteriology, *ibid.*, 1912—. Office V 54; Res. 1412 Humboldt St.

BESSIE WEBB BIRDSALL,
Professor of Domestic Art.

Student, Drexel Institute, Philadelphia, Pennsylvania, 1900-1901; Instructor in Domestic Art, Hill School, Florence, Massachusetts, 1901-1902; Graduate, Normal Domestic Art Course, Drexel Institute, 1903; Head of Department of Domestic Art, Winthrop State Normal and Industrial College, Rock Hill, South Carolina, 1903-1912; Instructor in Domestic Art, Vacation School, Buffalo, New York, Summer, 1906; Graduate Student, Teachers' College, Columbia University, Summers, 1911, 1912; Professor of Domestic Art, Kansas State Agricultural College, 1912—. Office L 55; Res. 611 Laramie St.

ROY ALISON HILL, Second Lieutenant, Seventh United States Infantry,
Professor of Military Science and Tactics, Commandant of Cadets.

Cadet, United States Military Academy, 1904-1908; Second Lieutenant, Seventh United States Infantry, 1908—; Professor of Military Science and Tactics, Commandant of Cadets, Kansas State Agricultural College, February 15, 1913—. Office N 29; Res. 617 Houston St.

LELAND EVERETT CALL, B. S. A.,
Professor of Soils.⁶

B. S. A., University of Ohio, 1906; Teaching Fellow, *ibid.*, 1906-1907; Assistant in Agronomy, Kansas State Agricultural College, 1907-1908; Assistant Professor of Soils, *ibid.*, 1908-1911; Associate Professor of Soils, *ibid.*, 1911-1913; Professor of Agronomy, *ibid.*, 1913—. Office Ag 204; Res. 609 N. Ninth St.

GEORGE ADAM DEAN, M. S.,
Professor of Entomology.⁶

B. S., Kansas State Agricultural College, 1895; State Teacher's Certificate, 1898; Principal, Highland Park (Topeka) Public School, 1898-1902; Assistant in Entomology, Kansas State Agricultural College, 1902-1905; M. S., *ibid.*, 1905; Instructor in Entomology, *ibid.*, 1905-1907; Assistant Professor of Entomology, *ibid.*, 1907-1912; Associate Professor of Entomology, *ibid.*, 1912-1913; Professor of Entomology, *ibid.*, 1913—. Office F 52; Res. 511 N. Juliette Ave.

ROBERT KIRKLAND NABOURS, PH. D.,
Professor of Zoölogy,⁶ Curator of the Natural History Museum.

Ed. B., School of Education, University of Chicago, 1905; Teacher of Natural History, and Assistant Curator of the Museum, *ibid.*, 1905-1909; Graduate Student in Zoölogy, University of Chicago, 1907-1910; Assistant in Zoölogy, *ibid.*, 1909-1910; Instructor in Zoölogy, Kansas State Agricultural College, 1910-1911; Ph. D., University of Chicago, 1911; Assistant Professor of Zoölogy, Kansas State Agricultural College, 1911-1913; Professor of Zoölogy, *ibid.*, 1913—. Office F 54; Res. 714 Poyntz Ave.

6. Effective September 1, 1913.

Principal of the School of Agriculture.

Professor of Heating and Sanitation.

ULA MAY DOW,⁷ B. S.,

Associate Professor in Charge of Domestic Science.

B. S., Kansas State Agricultural College, 1905; Teacher's Diploma, Massachusetts State Normal School, 1906; Assistant in Domestic Science, Kansas State Agricultural College, 1906; Instructor in Domestic Science, *ibid.*, 1906-1909; Assistant Professor of Domestic Science, *ibid.*, 1909-1913; Associate Professor in Charge of Domestic Science, 1913—.
Office L 30; Res. R. R. No. 1.

ALBERT MOORE TENEYCK,⁵ M. S.,

Superintendent of Fort Hays Branch Agricultural Experiment Station.

B. S. A., University of Wisconsin, 1893; Farmer, Wisconsin and Colorado, 1893-1896; Assistant in Agricultural Chemistry, Colorado Agricultural College, 1896-1897; M. S., *ibid.*, 1897; Assistant Professor of Agriculture, North Dakota Agricultural College and Experiment Station, 1897-1902; Professor of Agronomy, Kansas State Agricultural College, 1902-1910; Professor of Farm Management, *ibid.*, 1910-1911; Superintendent, Fort Hays Branch Agricultural Experiment Station, 1910-January 1, 1913.

GEORGE KELLER HELDER,

Superintendent, Fort Hays Branch Agricultural Experiment Station.

Student, Kansas State Agricultural College, 1888-1890; Clerk, First National Bank, Manhattan, 1891-1901; Cashier, *ibid.*, 1901-1904; Bookkeeper, Fort Hays Branch Experiment Station, 1904-1906; Secretary, *ibid.*, 1907-1908; Assistant Superintendent and Secretary, *ibid.*, 1909-January 1, 1913; Superintendent, *ibid.*, January 1, 1913—.
Office and Res. Hays, Kansas.

GEORGE SHERWOOD HINE, B. S., A.

State Dairy Commissioner.

B. S. A., University of Wisconsin, 1907; Student Instructor in Farm Engineering, *ibid.*, 1907; Assistant in Feed and Fertilizer Inspection and Dairy Tests, *ibid.*, 1907-1908; Principal, Marinette (Wisconsin) County School of Agriculture and Domestic Economy, 1909; Lecturer on Dairying, Department of College Extension, Kansas State Agricultural College, 1910-1912; State Dairy Commissioner, 1912—.
Office X 22; Res. 512 Houston St.

JACOB LUND, B. S.,

Superintendent of Heat, Water, and Gas Distribution.

B. S. Kansas State Agricultural College, 1883; Steam Fitter and Instructor in Blacksmithing, *ibid.*, 1883-1886; M. S., *ibid.*, 1886; Machinist, Santa Fe Railroad Shops, Topeka, 1886-1888; with Las Vegas Hot Springs Company, Las Vegas Hot Springs, New Mexico, 1888-1891; General Repairer, Sidney (Washington) Shingle Mill, 1891-1892; Engineer and Fireman, Capital Iron Works, Topeka, 1892-1893; Steam Fitter and Fireman, Kansas State Agricultural College, 1893-1898; Engineer, *ibid.*, 1898-1901; Superintendent, Heat and Power Department, *ibid.*, 1901-1912; Superintendent of Heat, Water, and Gas Distribution, *ibid.*, 1912—.
Office S 34; Res. 1420 Fairchild Ave.

GERTRUDE A BARNES,

Assistant Librarian.

Graduate, Blue Rapids High School, 1880; Student with Private Tutor, 1880-1882; Student, The Misses Black School for Young Ladies, Geneva, New York, 1882-1883; Librarian, Blue Rapids Public Library, 1889-1899; Student, Amherst College Summer School, 1899; Library Assistant, *ibid.*, 1899; Assistant Librarian, Kansas State Agricultural College, 1899-1908; Librarian, *ibid.*, 1908-1911; Assistant Librarian, *ibid.*, 1911—.
Office F 32; Res. 337 N. Sixteenth St.

5. Resigned.

7. Absent on leave, year 1912-1913.

ROBERT HENRY BROWN, B. M.,
Assistant Professor of Music.

B. M., Kansas Conservatory of Music, 1893; B. S., Kansas State Agricultural College, 1898; Special Student, Chicago Musical College, 1898-1900; Instructor in Violin and Band Instruments, Kansas State Agricultural College, 1900-1905; Assistant Professor of Music and Director of Orchestra, *ibid.*, 1905—.
Office M 27; Res. 331 N. Seventeenth St.

WILLIAM HIDDLESON ANDREWS, A. B.,
Assistant Professor of Mathematics.

Principal, Beloit High School, 1897-1898; A. B., University of Chicago, 1900; Superintendent, Blue Rapids City Schools, 1901-1905; Instructor in Mathematics, Leavenworth High School, 1905-1906; Assistant in Mathematics, Kansas State Agricultural College, 1906-1907; Graduate Student, University of Chicago, Summer, 1911; Assistant Professor of Mathematics, *ibid.*, 1907—; Principal of Subfreshman Department, *ibid.*, 1910—.
Office A 64; Res. 630 Moro St.

GEORGE CARPENTER WHEELER,⁵ B. S.,
Lecturer on Farm Management, Division of College Extension.

B. S., Kansas State Agricultural College, 1895; Farming, Railroading, and Studying 1895-1903; Assistant in Feeding Experiments, Kansas State Agricultural College, 1903-1905; Assistant in Animal Husbandry, *ibid.*, 1905-1907; Assistant Professor of Animal Husbandry, *ibid.*, 1907-1909; Lecturer on Farm Management, Division of College Extension, *ibid.*, 1909-June 1, 1918.

PLEASANT CRABTREE,
Lecturer on Farm Management, Division of College Extension.

Student, Fort Scott Normal Institute, 1885; Student, Lamar (Missouri) Normal Institute, 1885-1889; Instructor, Missouri Public Schools, 1886-1889; Student, Denver Business College, 1897; Editor, *Agricultural and Live Stock Herald*, Denver, 1897-1900; Lecturer, Missouri Farmers' Institutes, 1900-1904; Lecturer on Farm Management, Division of College Extension, Kansas State Agricultural College, 1908—.
Office A 36; Res. 931 Moro St.

KIRK WHITNEY STOUDER,⁸ D. V. M.,
Assistant Professor of Veterinary Medicine.

D. V. M., Iowa State College, 1905; House Surgeon, Iowa State College, 1904-1905; Veterinary Inspector, United States Department of Agriculture, 1905; Professor of Surgery and Anatomy, Washington State College, 1905-1908; Deputy State Veterinarian, Washington, 1905-1908; Assistant Professor of Veterinary Medicine, Kansas State Agricultural College, 1908—.
Office V 31; Res. 1007 Houston St.

LEONARD WHITTLESEY GOSS, D. V. M.,
Assistant Professor of Veterinary Medicine.

D. V. M., Ohio State University, 1905; Assistant in Veterinary Science, Kansas State Agricultural College, 1905-1907; Graduate Student, University of Michigan, Summer, 1906; Instructor in Veterinary Science, Kansas State Agricultural College, 1907-1909; Graduate Student, Tierärztliche Hochschule, Berlin, Germany, 1911-1912; Assistant Professor of Veterinary Medicine, Kansas State Agricultural College, 1909—.
Office V 56; Res. 113 S. Sixth St.

HERBERT HIRAM KING, A. M.,
Assistant Professor of Chemistry, Assistant Chemist in Engineering Experiment Station.

A. B., Ewing College, 1904; Professor of Chemistry, Manchester College, 1904-1906; A. M., Ewing College, 1906; Assistant in Chemistry, Kansas State Agricultural College, 1906-1908; Instructor in Chemistry, *ibid.*, 1908-1909; Graduate Student in Physical Chemistry, University of Chicago, Summer Session, 1909; Assistant Professor of Chemistry, Kansas State Agricultural College, 1909—; Assistant Chemist, Engineering Experiment Station, *ibid.*, 1910—.
Office C 56; Res. 916 Humboldt St.

5. Resigned.

8. Absent on leave.

JOHN BENNETT WHELAN, A. M.,
Assistant Professor in Chemistry.

A. B. and Ped. B., Hillsdale College, 1903; Instructor, Pawpaw (Illinois) High School, 1903-1905; Instructor, Rensselaer (Indiana) High School, 1905-1906; Instructor, Lincoln (Nebraska) High School, 1906-1908; Fellow, University of Nebraska, 1907-1908; A. M., ibid., 1908; Instructor in Chemistry, Kansas State Agricultural College, 1908-1909; Graduate Student in Organic Chemistry, University of Chicago, Summer, 1909; Assistant Professor of Chemistry, Kansas State Agricultural College, 1909—. Office C 41; Res. 511 Laramie St.

CHARLES OSCAR SWANSON, M. AGR.,
Assistant Professor of Agricultural Chemistry, Assistant Chemist in Engineering Experiment Station.

A. B., Carlton College, 1899; Principal, Jackson (Minnesota) High School, 1899-1900; Instructor, Cannon Falls (Minnesota) High School, 1900-1903; M. Agr., University of Minnesota, 1905; Instructor in Agricultural Chemistry and Assistant Chemist in Experiment Station, Purdue University, 1905-1906; Assistant Chemist in Agricultural Experiment Station, Kansas State Agricultural College, 1906—; Assistant Professor of Agricultural Chemistry, ibid., 1909—. Office C 6; Res. 981 Bluemont Ave.

LEWIS HENRY BEALL,⁷ A. B.,
Assistant Professor of English Literature.

A. B., Denison University, 1902; Principal, Rockwell City (Iowa) High School, 1902-1904; Principal, Ellsworth High School, 1905-1906; Assistant in English, Kansas State Agricultural College, 1907-1908; Instructor in English, ibid., 1908-1909; Assistant Professor of English, ibid., 1909-1911; Graduate Student, University of Chicago, Summer, 1910; Assistant Professor of English Literature, Kansas State Agricultural College, 1911—. Office A 57; Res. 220 S. Eighth St.

GEORGE EBEN BRAY, M. E.,
Industrial Engineer, Division of College Extension.

M. E., University of Minnesota, 1894; Instructor in Manual Training, Logan High School, Minneapolis, Minnesota, 1897-1898; Supervisor of Manual Training, Superior (Wisconsin) Public Schools, 1900-1903; Graduate Student, Columbia University, Summer, 1902; Graduate Student, University of Minnesota, Summer, 1903; Director of Mechanical Drawing and Manual Arts, New Trier Township High School, Kenilworth, Illinois, 1903-1909; Assistant Professor of Mechanical Engineering, Kansas State Agricultural College, 1909-1910; Superintendent of Shops, ibid., 1909—; Assistant Professor of Shop Methods and Practice, ibid., 1910-1912; Industrial Engineer, Division of College Extension, ibid., 1912—. Office A 33; Res. 817 Osage St.

WILMER ESLA DAVIS, A. B.,
Assistant Professor of Botany.

Graduate, Ohio Normal University, 1894; Public School Work, 1894-1900; A. B., University of Illinois, 1903; Principal, Rossville (Illinois) High School, 1903-1904; Instructor, Great Falls (Montana) High School, 1904-1905; Instructor in Science, Urbana (Illinois) High School, 1905-1908; Graduate Student in Botany, University of Chicago, 1908-1909, and Summers, 1908, 1909, and 1910; Assistant Professor of Botany, Kansas State Agricultural College, 1909—. Office H 57; Res. 881 Leavenworth St.

FRANCES LANGDON BROWN, B. S.,
Lecturer on Domestic Science, Division of College Extension.

Graduate, Kansas State Normal School, 1898 and 1906; Instructor, Madison (Kansas) City Schools, 1899-1900; Instructor, Shorey Public Schools, 1901-1902; Instructor, Topeka City Schools, 1902-1908; Student, State Manual Training Normal School, 1908; B. S., Kansas State Agricultural College, 1909; A. B., Kansas State Normal School, 1913; Lecturer on Domestic Science, Division of College Extension, Kansas State Agricultural College, 1909—. Office A 36; Res. 519 Houston St.

7. Absent on leave, year 1912-1913.

WALTER SCOTT GEARHART, B. S. in C. E.,
State Highway Engineer, Division of College Extension.

Student, Bucknell University, 1899-1902; Chairman, United States Coal and Coke Company (West Virginia); Transitman, Pere Marquette Railroad Company (Michigan); Assistant Engineer, Chicago and Alton Railroad Company (Missouri); Assistant State Highway Engineer, Illinois Highway Commission; B. S. in C. E., University of Missouri, 1907; Highway Engineer, Division of College Extension, Kansas State Agricultural College, 1909—.

Office A 36; Res. 114 N. Juliette Ave.

JAMES HENRY BURT, D. V. M.,
Assistant Professor of Veterinary Medicine.

V. S., Ontario Veterinary College, 1895; Private Practice, 1895-1903; D. V. M., Ohio State University, 1905; Veterinary Inspector, United States Bureau of Animal Industry, 1905-1909; Assistant in Veterinary Medicine, Kansas State Agricultural College, 1909-1910; Assistant Professor of Veterinary Medicine, *ibid.*, 1910—.

Office V 27; Res. 811 Poyntz Ave.

HARRY BRUCE WALKER, B. S. in C. E.,
Drainage Engineer, Division of College Extension.

Student, Iowa State College, 1906-1910; Topographer, Chicago, Burlington and Quincy Railroad Company, 1906-1907; Student Assistant, Iowa State College, 1909-1910; Draftsman, Great Northern Railway Company, 1910; Drainage Engineer, Humboldt, Iowa, 1909-1910; B. S. in C. E., Iowa State College, 1910; Drainage Engineer, Division of College Extension, Kansas State Agricultural College, 1910—.

Office A 36; Res. 712 Poyntz Ave.

ARTHUR HENRY LEIDIGH, B. S.,
Assistant Professor of Crops.

B. S., Kansas State Agricultural College, 1902; Farm Hand, 1902-1903; with Office of Grain Investigations, United States Department of Agriculture, as Superintendent of Experiment Station, Channing, Texas, 1903-1905; Superintendent Experiment Station, Amarillo, Texas, 1905-1908; Farmer, Hutchinson, Kansas, 1908-1911; Collaborator, United States Department of Agriculture, 1908-1911; Assistant Professor of Crops, Kansas State Agricultural College, 1911—.

Office Ag 301; Res. 1638 Osage St.

MICHAEL FRANCIS AHEARN, M. S.,
Assistant Professor of Floriculture.

B. S., Massachusetts Agricultural College, 1904; Assistant in Horticulture, Kansas State Agricultural College, 1904-1909; Head Coach in Athletics, *ibid.*, 1905-1911; Instructor in Horticulture, *ibid.*, 1909-1911; M. S., *ibid.*, 1913; Assistant Professor of Floriculture, *ibid.*, 1911—.

Office H 32; Res. 507 Laramie St.

EVERETT PARKER JOHNSTON, A. B.,
Assistant Professor in Charge of Public Speaking.

A. B., Oberlin College, 1897; Graduate, Emerson College of Oratory, 1899; Instructor in Public Speaking, University of North Dakota, 1899-1902; Graduate Student, University of Chicago, Summer, 1901; Reader under Management Chicago Lyceum Bureau, 1907-1909; Assistant in Public Speaking, Kansas State Agricultural College, 1909-1910; Instructor in Public Speaking, *ibid.*, 1910-1911; Assistant Professor in Charge of Public Speaking, 1911—.

Office N 53; Res. 608 Bluemont Ave.

RALPH RALPH DYKSTRA, D. V. M.,
Assistant Professor of Veterinary Medicine.

Registered Pharmacist in Iowa, 1900; D. V. M., Iowa State College, 1905; Assistant Professor of Anatomy, Obstetrics, and Clinics, *ibid.*, 1905-1907; Associate Professor of Anatomy, Obstetrics, and Clinics, *ibid.*, 1907-1909; Professor of Anatomy, Obstetrics, and Clinics, *ibid.*, 1909-1911; Veterinary Inspector, United States Bureau of Animal Industry, Summer, 1911; Assistant Professor of Veterinary Medicine, Kansas State Agricultural College, 1911—.

Office V 31; Res. 714 Houston St.

HARRY LLEWELLYN KENT,

Director of Instruction by Correspondence, Division of College Extension.

Graduate, Kansas State Normal School, 1904; Assistant, Science Department, *ibid.*, 1902-1904; Instructor in Science and Geography, Western State Normal School, 1904-1909; Student, University of Chicago, Summer, 1908; Special Student, Kansas State Agricultural College, Summer, 1909; Instructor in Nature Study and Elementary Agriculture, New Hampshire State Normal School, 1909-1911; Student, Cornell University, Summer, 1910; Director of Instruction by Correspondence, Division of College Extension, Kansas State Agricultural College, 1911-—.

Office A 35; Res. 501 Laramie St.

ALFRED EVERETT WHITE, M. S.,

Assistant Professor of Mathematics.

B. S., Purdue University, 1904; Principal, Lapel (Indiana) High School, 1904-1906; Instructor, Shortridge High School, Indianapolis, 1906-1907; Principal, Connersville (Indiana) High School, 1907-1909; Assistant in Mathematics, Kansas State Agricultural College, 1909-1910; Instructor in Mathematics, *ibid.*, 1910-1912; Assistant Professor of Mathematics, *ibid.*, 1912-—.

Office A 69; Res. 712 Poyntz Ave.

WALTER WILLIAM CARLSON, B. S.,

Assistant Professor of Shop Methods and Practice, Superintendent of Shops.

Apprentice in Machine Shops, Kansas State Agricultural College, 1903-1904; B. S., *ibid.*, 1908; Instructor in Mechanical Engineering, Montana State College, 1908-1909; Graduate Student, Armour Institute, Summer, 1909; Assistant Professor of Mechanical Engineering, Montana State College, 1909-1910; Assistant in Machine Tool Work, Kansas State Agricultural College, 1910-1911; Instructor in Machine Tool Work, *ibid.*, 1911-1912; Foreman of Machine Shop, *ibid.*, 1910-1912; Assistant Professor of Shop Methods and Practice, Superintendent of Shops, *ibid.*, 1912-—.

Office S 62; Res. 608 Bluemont Ave.

JOHN WILLIAM SCOTT, PH. D.,

Assistant Professor of Zoölogy.

A. B., Missouri State University, 1896; A. M., *ibid.*, 1897; Graduate Student in Zoölogy, University of Chicago, 1901-1904; Assistant in Embryology, *ibid.*, 1902; Fellow in Zoölogy, *ibid.*, 1902-1904; Ph. D., *ibid.*, 1904; Head of Department of Biology, Westport High School, Kansas City, Missouri, 1904-1911; Instructor in Zoölogy, Marine Biological Laboratory, Woods Hole, Massachusetts, 1907-1911; Instructor in Zoölogy, Kansas State Agricultural College, 1911-1912; Assistant Professor of Zoölogy, *ibid.*, 1912-—.

Office F 62; Res. 321 Delaware St.

CHARLES WILBUR McCAMPBELL, B. S., D. V. M.,

Assistant Professor of Animal Husbandry.

B. S., Kansas State Agricultural College, 1906; Graduate Student, *ibid.*, 1906-1907; D. V. M., *ibid.*, 1910; Assistant in Animal Husbandry, *ibid.*, 1910-1912; Secretary, Kansas State Live Stock Registry Board, 1912-—; Assistant Professor of Animal Husbandry, Kansas State Agricultural College, 1912-—.

Office Ag 9; Res. 801 Laramie St.

GEORGE OGDEN GREENE, M. S.,

Lecturer on Horticulture, Division of College Extension.

B. S., Kansas State Agricultural College, 1900; Assistant in Horticulture, *ibid.*, 1901-1903; M. S., *ibid.*, 1902; Assistant in Horticulture, Massachusetts Agricultural College, 1903-1905; with Worley and Greene, Merchants, 1905-1910; Lecturer on Horticulture, Division of College Extension, Kansas State Agricultural College, 1912-—.

Office A 37; Res. 915 Fremont St.

EDWARD CARL JOHNSON, A. M.,

Superintendent of Farmers' Institutes, Division of College Extension.

Student Assistant in Botany, University of Minnesota, 1905-1906; A. B., *ibid.*, 1906; Instructor in Botany, *ibid.*, 1906-1907; A. M., *ibid.*, 1907; Assistant Plant Pathologist, United States Department of Agriculture, 1907; Plant Pathologist, in Charge of Cereal Disease Work, *ibid.*, 1908-1912; Graduate Student, George Washington University, 1910-1911; Superintendent of Farmers' Institutes, Division of College Extension, Kansas State Agricultural College, 1912-—.

Office A 37; Res. 1130 Houston St.

EDWARD DAVID McDONALD,⁵ A. M.,

Acting Assistant Professor of English Literature.

Student Assistant in English, University of Indiana, 1909; A. B., *ibid.*, 1910; Teaching Fellow in English, *ibid.*, 1910-1911; Instructor in English, *ibid.*, 1911-1912; A. M., *ibid.*, 1912; Acting Assistant Professor of English Literature, Kansas State Agricultural College, 1912-1913.

Office A 58; Res. 927 Leavenworth St.

CARL OSTRUM, A. M.,

Assistant Professor of the English Language.

A. B., Bethany College, 1904; A. B., Yale University, 1905; Graduate Student, *ibid.*, 1905-1907; A. M., *ibid.*, 1906; Instructor in English, Gustavus Adolphus College, 1907-1908; Principal, Bunkerhill (Kansas) High School, 1908-1910; Acting Professor of English, Tabor College, 1910-1911; Instructor in English, Oklahoma College of Agriculture and Mechanic Arts, 1911-1912; Assistant Professor of the English Language, Kansas State Agricultural College, 1912—.

Office A 69; Res. 815 Poyntz Ave.

CHRISTIAN DANIEL STEINER, B. S.,

Supervisor of Boys' and Girls' Agricultural Clubs, Division of College Extension.

Teacher, Public Schools of Ohio, 1896-1900; Principal, Riley Township High School, Pandora, Ohio, 1902-1907; B. S., Lima College, 1907; Graduate Student, University of Chicago, Summer, 1907; Superintendent, Riley Township Schools, Pandora, Ohio, 1907-1910; Assistant in Agricultural Extension College of Agriculture, Ohio State University, 1910-1912; B. S. in Education, *ibid.*, 1912; Supervisor of Boys' and Girls' Agricultural Clubs, Division of College Extension, Kansas State Agricultural College, 1912—.

Office A 36; Res. 109 N. Ninth St.

ALVIN SCOTT NEALE, B. S. A.,

Lecturer on Dairy Husbandry, Division of College Extension.

Superintendent of Farm, Ohio State University, 1903-1904; B. S. A., *ibid.*, 1904; Agricultural Correspondent, Scripps-McRea League of Newspapers, 1904-1907; Dairy Lecturer, Agricultural Extension Department, Ohio State University, 1908-1913; Lecturer on Dairy Husbandry, Division of College Extension, Kansas State Agricultural College, January 1, 1913—.

Office A 36; Res. ——.

WILLIAM CARL LANE, B. S.,

Assistant Professor of Electrical Engineering.⁶

B. S., Kansas State Agricultural College, 1905; Student Apprentice with Allis-Chalmers Company, 1905-1906; Electrical Tester with Allis-Chalmers Company, 1906-1907; Assistant in Physics, Kansas State Agricultural College, 1907-1908; Assistant in Electrical Engineering, *ibid.*, 1908-1913; Assistant Professor of Electrical Engineering, *ibid.*, 1913—.

Office C 63; Res. 1081 Humboldt St.

BLANCHE EARL ENYART, A. B.,

Instructor in Physical Training, in Charge of Women.

A. B., University of Michigan, 1904; Graduate, Chautauqua School of Physical Education, 1905; Instructor in Physical Training, Saginaw (Michigan) High School, 1905-1907; Instructor in Physical Training, Kansas City (Missouri) High School, 1907-1910; Graduate Student, Harvard University Summer School, 1910; Director of Physical Training for Women, Kansas State Agricultural College, 1910-1911; Instructor in Physical Training, in Charge of Women, *ibid.*, 1911—.

Office N 8; Res. 1301 Poyntz Ave.

ADA RICE, M. S.,

Instructor in the English Language.

B. S., Kansas State Agricultural College, 1895; Assistant in English, *ibid.*, 1899-1905; Life Teacher's Certificate for Kansas, 1900; Graduate Student, University of Chicago, 1902; Graduate Student, Harvard University Summer School, 1905; Instructor in English, Kansas State Agricultural College, 1905-1911; M. S., *ibid.*, 1912; Instructor in the English Language, *ibid.*, 1911—.

Office A 61; Res. 917 Osage St.

5. Resigned.

6. Effective September 1, 1918.

DAISY DOROTHY ZEININGER, A. B.,
Instructor in Mathematics.

A. B., Fairmount College, 1900; Instructor, Ellsworth High School, 1900-1904; Assistant in Mathematics, Kansas State Agricultural College, 1904-1907; Instructor in Mathematics, *ibid.*, 1907-; Graduate Student, University of Chicago, Summer, 1909. Office A 72; Res. 601 Humboldt St.

ELLA WEEKS,⁵ A. B.,
Instructor in Drawing and in Color and Design.

A. B., University of Kansas, 1901; Illustrator in Biological Departments, Kansas State Agricultural College, 1903-1904; Assistant in Drawing, *ibid.*, 1904-1908; Graduate Student, Summer School of the South, Knoxville, Tennessee, Summer, 1906; Graduate Student, Marine Biological Laboratory, Woods Hole, Massachusetts, Summer, 1907; Instructor, Ruston (Louisiana) Summer School, Summer, 1909; Instructor in Drawing and in Color and Design, Kansas State Agricultural College, 1908-.

BURTON RAY ROGERS, D. V. M.,
Instructor in Veterinary Medicine.

D. V. M., Iowa State College, 1899; Graduate Student, McKillip Veterinary College, Chicago, 1899-1900; House Physician and Demonstrator of Anatomy in Veterinary Department, Iowa State College, 1900; Inspector in Bureau of Animal Industry, United States Department of Agriculture, 1900-1905; Student, Dearborn Night Medical College, Chicago, 1905-1906; Instructor in Veterinary Medicine, Kansas State Agricultural College, 1906-
Office V 32; Res. 917 Pierre St.

INA FOOTE COWLES, B. S.,
Instructor in Domestic Art.

B. S., Kansas State Agricultural College, 1901; Graduate Student, Teachers' College, Columbia University, 1905-1906; Assistant in Domestic Art, Kansas State Agricultural College, 1902-1905 and 1906-1909; Instructor in Domestic Art, *ibid.*, 1909-
Office L 56; Res. 1026 Houston St.

ANNETTE LEONARD A. B.,
Instructor in the English Language.

Student, Wellesley College, 1897-1900; Instructor, Topeka City Schools, 1903-1904; Reference Library Assistant, University of Kansas, 1904-1905; A. B., *ibid.*, 1906; Graduate Student, *ibid.*, 1906; Assistant in English, Kansas State Agricultural College, 1907-1908; Graduate Student, University of Chicago, Summer, 1910; Instructor in the English Language, *ibid.*, 1909-
Office K 52; Res. 910 Fremont St.

WILLIAM LEONARD HOUSE,
Instructor in Woodwork, Foreman of Carpenter Shop.

Apprentice with J. Adams and Sons Company, Amherst, Massachusetts, 1868-1869; with the Newton Wagon Works, Batavia, Illinois; Foreman, Carpenter Shop, Atchison, Topeka and Santa Fé Railroad Company, Las Vegas, New Mexico, 1880-1883; Cabinet-maker, with the Howell Company, Sioux City, Iowa, 1888-1888; Foreman of Carpenter Shop, Kansas State Agricultural College, 1888-; Instructor in Woodwork, *ibid.*, 1909-
Office S 28; Res. 608 Moro St.

JEREMIAH HAFFER HOLLAR,
Instructor in Forging, Foreman of Blacksmith Shop.

Apprentice in Blacksmithing, Greenspring, Pennsylvania; Foreman, Lake Shore and Michigan Southern Railway Shops, White Pigeon, Michigan; with Miller Machine and Iron Company, Muskegon, Michigan, 1880-1882; with Novelty Iron Works, *ibid.*, 1882-1885; with Rogers Iron Works, *ibid.*, 1885-1887; in General Blacksmithing, 1887-1908; Instructor, Illinois Manual Training School, Glenwood, Illinois, 1903-1908; with Ornamental Iron Works, Chicago, 1908-1909; Instructor in Forging, Foreman of Blacksmith Shop, Kansas State Agricultural College, 1909-
Office S 38; Res. 519 N. Juliette Ave.

* Resigned.

ANNIE ELSIE LINDSEY,
Instructor in Domestic Science.

Graduate, California State Normal School (San José), 1901; Instructor, San José (California) City Schools, 1901-1904; Student, University of the Pacific, 1904-1905; Instructor, San José City Schools, 1905-1906; Student, Simmons College, 1905-1907; Instructor, Girls' Trade School, Boston, 1907-1908; Assistant in Domestic Science, Kansas State Agricultural College, 1908-1910; Instructor in Domestic Science, *ibid.*, 1910—. Office L 35; Res. 1027 Houston St.

PORTR JOSEPH NEWMAN, M. S.,
Instructor in Chemistry.

B. S., Franklin College, 1908; Assistant in Chemistry, *ibid.*, 1907-1908; Assistant Chemist, Indianapolis Board of Health, 1907-1908; Graduate Student, University of Chicago, Summer, 1909; Assistant in Chemistry, Kansas State Agricultural College, 1909-1910; M. S., Franklin College, 1910; Instructor in Chemistry, *ibid.*, 1910—. Office C 64; Res. 917 Fremont St.

RAYMOND GARFIELD TAYLOR, A. B.,
Instructor in History and Civics.

A. B., University of Kansas, 1907; Principal and Instructor in History, Hiawatha High School, 1907-1910; Graduate Student, University of Kansas, Summer, 1909; Graduate Student, University of Chicago, Summer, 1911; Instructor in History and Civics, Kansas State Agricultural College, 1910—. Office F 58; Res. 1819 Humboldt St.

EARL NATANEAL RODELL,⁵ B. S.,
Acting Superintendent of Printing.

With Marquette Tribune, 1897-1898; Student Employee, Department of Printing, Kansas State Agricultural College, 1898-1901; B. S., *ibid.*, 1903; Assistant in Printing, *ibid.*, 1903-1911; General Manager of Athletics, *ibid.*, 1911; Instructor in Printing, *ibid.*, 1911—; in Charge of Printing, November 1, 1912-1913; Acting Superintendent of Printing, 1913—.

ESTELLA MAY BOOT, A. M.,
Instructor in the English Language.

Teacher in Public Schools, Hartley, Iowa, 1897-1898; A. B., University of South Dakota, 1901; Assistant in English and Latin, Cherokee (Iowa) High School, 1901-1906; Principal, *ibid.*, 1906-1908; Graduate Student, State University of Iowa, Summer, 1905; Instructor in Summer School and Institute, Cherokee County, Iowa, 1907-1908; A. M., Northwestern University, 1909; Assistant in English, Kansas State Agricultural College, 1909-1911; Graduate Student, Columbia University, Summer, 1912; Instructor in the English Language, *ibid.*, 1911—. Office A 55; Res. 910 Fremont St.

JAMES RUSSELL JENNESS, B. S.,
Instructor in Physics.

B. S., Denison University, 1906; Professor of Natural Science, Lenox College, 1906-1908; Assistant in Physics, University of Kentucky, 1908-1909; Assistant in Physics, Kansas State Agricultural College, 1909-1911; Instructor in Physics, *ibid.*, 1911—. Office C 61; Res. 608 N. Manhattan Ave.

FRANK CLYDE HARRIS, B. S.,
Instructor in Architecture and Drawing.

B. S., Kansas State Agricultural College, 1908; City Engineer, Manhattan, Kansas, 1907-1909; Supervising Engineer, W. K. Palmer Company, 1909; Assistant in Architecture and Drawing, Kansas State Agricultural College, 1909-1911; Graduate Student, Chicago Art Institute, Summer, 1910; Student, Italy, Germany, and France, Summer, 1911; Instructor in Architecture and Drawing, Kansas State Agricultural College, 1911—. Office A 66; Res. 630 Bluemont Ave.

EDWIN CYRUS MILLER, PH. D.,
Instructor in Botany.

A. B., Lebanon College, 1906; A. B., Yale University, 1907; Graduate Student, *ibid.*, 1907-1910; Ph. D., *ibid.*, 1910; Assistant in Botany, Kansas State Agricultural College, 1910-1911; Instructor in Botany, *ibid.*, 1911—. Office H 56; Res. 514 N. Juliette Ave.

5. Resigned.

CHARLES HENRY CLEVINGER, M. S.,
Instructor in Mathematics.

B. S., Ohio State University, 1902; Acting Professor of Mathematics and Physics, Drury College, 1903-1904; Instructor in Mathematics, Sheboygan (Wisconsin) High School, 1906-1908; Professor *pro tem.* of Pure and Applied Mathematics, Tarkio College, Spring Term, 1909; M. S., University of Chicago, 1910; Assistant in Mathematics, Kansas State Agricultural College, 1910-1911; Instructor in Mathematics, *ibid.*, 1911—. Office A 71; Res. 831 Laramie St.

EUSTACE VIVIAN FLOYD, B. S.,
Instructor in Physics.

B. S., Earlham College, 1903; Instructor in Chemistry, Westtown School, Philadelphia, Pennsylvania, 1903-1905; Professor of Physics, Guilford College, 1905-1909; Graduate Student and Assistant in Physics, University of Chicago, 1909-1911; Instructor in Physics, Kansas State Agricultural College, 1911—. Office C 57; Res. 8 Park Road.

IVOR VICTOR ILES, A. M.,
Instructor in History and Civics.

Graduate, Eastern Illinois State Normal School, 1901; A. B., University of Kansas, 1905; Fellow in European History, *ibid.*, 1904-1905; A. M., *ibid.*, 1905; Graduate Student and Assistant in History, University of Colorado, 1905-1906; Graduate Student and Assistant in European History, University of Wisconsin, 1906-1907; Instructor in History, Politics, and Economics, Princeton University, 1907-1908; Harrison Fellow in American History, University of Pennsylvania, 1908-1909; Instructor in History, Anaconda (Montana) High School, 1909-1910; Instructor in History, Yale University, 1910-1911; Instructor in History and Civics, Kansas State Agricultural College, 1911—. Office F 58; Res. 712 Poyntz Ave.

ERNEST ALEXANDER HEILMAN, A. M.,
Instructor in German.

A. B., Northwestern College, 1905; A. B., University of Minnesota, 1906; Instructor, Antigo (Wisconsin) High School, 1906-1907; Graduate Student, University of Wisconsin, 1907-1911; A. M., *ibid.*, 1908; Assistant in German, *ibid.*, 1908-1911; Graduate Student, Universities of Berlin and Munich, 1911-1912; Instructor in German, Kansas State Agricultural College, 1911—. Office N 61; Res. 824 Houston St.

CHARLAINE FURLEY, A. B.,
Instructor in the English Language.

A. B., Fairmount College, 1906; Student Assistant in English, *ibid.*, 1905-1906; Assistant in Preparatory Department, Kansas State Agricultural College, 1906-1908; Assistant in English, *ibid.*, 1908-1911; Assistant in the English Language, *ibid.*, 1911-1912; Instructor in the English Language, *ibid.*, 1912—. Office K 56; Res. 724 Houston St.

HARRISON ELEAZER PORTER, B. S.,
Instructor in Mathematics.

B. S., Kansas State Agricultural College, 1907; with Engineering Department, Santa Fe Railway, Summer, 1907; Graduate Student, Harvard University, Summer, 1910; Graduate Student, Columbia University, Summer, 1911; Assistant in Mathematics, Kansas State Agricultural College, 1908-1912; Instructor in Mathematics, *ibid.*, 1912—. Office A 70; Res. 1024 Houston St.

TURNER RICHARDSON HADEN WRIGHT, B. S. A.,
Instructor in Animal Husbandry.

B. S. A., University of Missouri, 1909; Assistant in Animal Husbandry, Kansas State Agricultural College, 1909-1912; Instructor in Animal Husbandry, *ibid.*, 1912—. Office Ag 6; Res. 1919 Humboldt St.

NELSON ANTRIM CRAWFORD, JR., A. B.,
Instructor in the English Language.

Newspaper Writer, Iowa City and Council Bluffs (Iowa), 1906-1909; Undergraduate Assistant in English, State University of Iowa, 1909-1910; A. B., *ibid.*, 1910; Instructor, Kansas Teachers' Institutes, 1912—; Graduate Student, University of Kansas, 1913—; Assistant in English, Kansas State Agricultural College, 1910-1911; Assistant in the English Language, *ibid.*, 1911-1912; Instructor in the English Language, *ibid.*, 1912—. Office A 58; Res. 113 S. Eighth St.

JAMES BURGESS FITCH, B. S.,
Instructor in Dairy Husbandry.

B. S., Purdue University School of Agriculture, 1910; in Charge of Milk Supply, Children's Aid Association, Indianapolis, Indiana, Summer, 1910; Assistant in Dairy Husbandry, Kansas State Agricultural College, 1910-1912; Instructor in Dairy Husbandry, *ibid.*, 1912—. Office D 30; Res. 815 Poyntz Ave.

THORNTON HAYES,
Instructor in Machine Tool Work, Foreman of Machine Shop.

Apprentice, Atchison, Topeka and Santa Fe Railway Company, 1904-1908; Machinist, Kansas Natural Gas Company, Scipio and Independence, 1908-1909; Foreman of Machine Shop, *ibid.*, 1909-1910; Assistant in Machine Shop, Kansas State Agricultural College, 1910-1912; Instructor in Machine Tool Work, Foreman of Machine Shop, *ibid.*, 1912—. Office S 31; Res. 608 Belmont Ave.

JOSIAH SIMSON HUGHES, M. S.,
Instructor in Chemistry.

B. S., Ohio Wesleyan University, 1908; Instructor, *ibid.*, 1908-1909; M. S., *ibid.*, 1909; Fellow, Ohio State University, 1909-1910; A. M., *ibid.*, 1910; Assistant in Chemistry, Kansas State Agricultural College, 1910-1912; Instructor in Chemistry, *ibid.*, 1912—. Office C 27; Res. 607 Wattier St.

ARTHUR WILLIAM RUDNICK, B. S.,
Instructor in Dairy Husbandry.

B. S., Iowa State College, 1910; Butter Maker, Alpha Creamery, Denver, 1910; Assistant in Dairy Husbandry, Kansas State Agricultural College, 1910-1912; Instructor in Dairy Husbandry, *ibid.*, 1912—. Office D 2; Res. 1106 Laramie St.

EDWIN GEORGE SCHAFER, M. S.,
Instructor in Farm Crops.

B. S., Kansas State Agricultural College, 1907; Assistant in Agronomy, *ibid.*, 1907-1909; Graduate Student, University of Illinois, 1909-1910; M. S., *ibid.*, 1910; Assistant in Farm Crops, Kansas State Agricultural College, 1910-1912; Instructor in Farm Crops, *ibid.*, 1912—. Office Ag 301; Res. 1605 Humboldt St.

WILLIAM TIMOTHY STRATTON, A. B.,
Instructor in Mathematics.

A. B., University of Indiana, 1906; Superintendent, Oneida (Illinois) Public Schools, 1906-1907; Principal, McCray-Dewey Academy (Troy, Illinois), 1907-1910; Graduate Student, University of Indiana, Summers, 1910 and 1911; Instructor, Jewell County Normal Institute, 1911; Assistant in Mathematics, Kansas State Agricultural College, 1910-1912; Instructor in Mathematics, *ibid.*, 1912—. Office A 54; Res. 806 Poyntz Ave.

OLIVER WILLIAM HUNTER, M. S.,
Instructor in Bacteriology.

B. S., Kansas State Agricultural College, 1909; Student Assistant and Graduate Student in Bacteriology, *ibid.*, 1909-1910; M. S., University of Wisconsin, 1911; Assistant in Bacteriology, Kansas State Agricultural College, 1911-1912; Instructor in Bacteriology, *ibid.*, 1912—. Office V 52; Res. 1616 Fairchild Ave.

CLYDE BYRON BECK, A. B.,

Instructor in the English Language.

A. B., Earlham College, 1906; Instructor in German, Noblesville (Indiana) High School, 1907-1908; Principal, Upland (Indiana) High School, 1909-1910; Instructor in Latin and English, Plant City (Florida) High School, 1910-1911; Instructor in German and English, Northwestern Military Academy, Highland Park, Illinois, 1911-1912; Instructor in the English Language, Kansas State Agricultural College, 1912—.
Office A 53; Res. 315 Poyntz Ave.

EDWARD GRANT,

Instructor in Molding, Foreman of Foundry.

Apprentice, with More and Dargie, Engineers, Millwrights, Iron and Brass Founders, Broomhill, Forfarshire, Scotland, 1880-1886; with the Chicago Tire and Spring Company, Melrose Park, Illinois, 1887-1890; Foreman of Foundry, R. Beaumont and Son, Kankakee, Illinois, 1890-1897; with the David Bradley Manufacturing Company, Bradley, Illinois, 1897-1900; Foreman of Foundry, Burrell Manufacturing Company, ibid., 1900-1905; Foreman, North Star Iron Works, Hammond, Indiana, 1905-1908; Foreman, Burrell Manufacturing Company, Bradley, Illinois, 1908-1913; Instructor in Molding, Foreman of Foundry, Kansas State Agricultural College, January 7, 1913—.
Office S 42; Res. 922 N. Manhattan Ave.

MARY THERESA HARMAN, PH. D.,

Instructor in Zoölogy.

Student Assistant in Botany and Zoölogy, Indiana State Normal School, 1903-1904; Graduate, ibid., 1904; Teaching Fellow, Biological Station, University of Indiana, Summer, 1905; Instructor in Embryology and Histology, ibid., Summers, 1906-1909, 1911, 1912; A. B., ibid., 1907; Instructor in Zoölogy, Pennsylvania State College, 1907-1910; A. M., University of Indiana, 1909; Teaching Fellow in Zoölogy, ibid., 1910-1912; Ph. D., ibid., 1912; Instructor in Zoölogy, Kansas State Agricultural College, 1912—.
Office F 55; Res. 414 N. Juliette Ave.

ELDEN VALORIUS JAMES, A. M.,

Instructor in History and Civics.

Principal, Caywood (Ohio) Public Schools, 1895-1897 and 1901-1902; A. B., Marietta College, 1901; Assistant Principal, Williamstown (West Virginia) High School, 1902-1904; A. B., University of Michigan, 1905; Head of Department of History, Monmouth (Illinois) High School, 1905-1906; Principal, West Palm Beach (Florida) High School, 1906-1908; A. M., Marietta College, 1908; Instructor in History, ibid., Summers, 1902, 1908, 1910; Professor of History and Economics, West Virginia Wesleyan College, 1908-1909; Head of Department of History, Wichita High School, 1909-1911; Vice Principal, ibid., 1911-1912; Instructor in History and Civics, Kansas State Agricultural College, 1912—.
Office F 1; Res. 927 Humboldt St.

ROBERT ANDREW JEHLE, M. S. A.,

Instructor in Botany, Assistant Plant Pathologist.

B. S. A., University of Minnesota, 1905; M. S. A., ibid., 1910; Instructor in Science and Agriculture, Wheaton (Minnesota) High School, 1910-1911; Fellow in Plant Pathology, Cornell University, and Field Pathologist for Newfane (New York) Fruit Growers' Association, 1911-1912; Instructor in Botany, Assistant Plant Pathologist, Kansas State Agricultural College, 1912—.
Office H 56; Res. 1021 Osage St.

JOSEPH HENRY MERRILL, B. S.,

Instructor in Entomology, Assistant Entomologist.

B. S., Dartmouth College, 1905; on Insect Pest Suppression Work, Massachusetts, 1905-1908; Graduate Student in Entomology, Massachusetts Agricultural College, 1909-1911; Deputy State Nursery Inspector, Massachusetts, 1910-1911; Instructor in Entomology, Assistant Entomologist, Kansas State Agricultural College, 1912—.
Office F 55.

MAURICE COLE TANQUARY,⁹ PH. D.,*Instructor in Entomology, Assistant Entomologist.*

A. B., University of Illinois, 1907; Assistant to Illinois State Entomologist, 1907-1909; Assistant in Entomology and Zoölogy, University of Illinois, 1907-1909; A. M., ibid., 1908; Assistant in Entomology, ibid., 1909-1912; Graduate Student, Bussey Institution, Harvard University, Summer, 1910; Assistant to Minnesota State Entomologist, Summer, 1911; Ph. D., University of Illinois, 1912; Instructor in Entomology and Assistant Entomologist, Kansas State Agricultural College, 1912—.

9. Absent on leave after April 10, 1913.

CLAUDE M VESTAL, B. S. A.,

Instructor in Animal Husbandry.

B. S. A., Purdue University, 1911; Assistant in Agricultural Extension, *ibid.*, 1911-1912; Instructor in Animal Husbandry, Kansas State Agricultural College, 1912—. Office Ag 1; Res. 815 Poyntz Ave.

ADALINE MAITLAND BAKER, B. L. S.,

Head Cataloguer in Library.

B. L. S., University of Illinois, 1902; Head Cataloguer in Library, Northwestern University, 1902-May 1, 1913; Head Cataloguer in Library, Kansas State Agricultural College, May 1, 1913—. Office F 28; Res. 901 Laramie St.

JENNIE ELIZABETH CATON, B. S.,

Instructor in Domestic Science.⁶

Student, School of Science, Simmons College, 1904-1908; Student, School of Household Economics, *ibid.*, 1910-1911; B. S., *ibid.*, 1911; Assistant in Domestic Science, Kansas State Agricultural College, 1911-1913; Instructor in Domestic Science, *ibid.*, 1913—. Office L 42; Res. 910 Fremont St.

CARLOTTA MARKS FORD, A. B.,

Instructor in Domestic Science.⁶

Instructor, Geneva (Illinois) Schools, 1903-1904; Student, Northern Illinois State Normal School, Summer, 1904; Instructor, North Aurora (Illinois) School, 1906-1907; A. B., University of Illinois, 1911; Assistant in Domestic Science, Kansas State Agricultural College, 1911-1913; Instructor in Domestic Science, *ibid.*, 1913—. Office L 35; Res. 909 Fremont St.

VIRGINIA LEE MEADE, B. S.,

Instructor in Domestic Science.⁶

B. S., Kansas State Agricultural College, 1909; Lecturer and Demonstrator in Domestic Science, Chautauqua Assemblies, Summer, 1909; Substitute Assistant in Domestic Science, Kansas State Agricultural College, Fall Term, 1909; Instructor in Manual Training, Topeka Public Schools, 1910; Graduate Student, Teachers' College, Columbia University, Summer, 1910; Instructor in Domestic Science, Topeka High School, 1910-1912; Assistant in Domestic Science, Kansas State Agricultural College, 1912-1913; Instructor in Domestic Science, *ibid.*, 1913—. Office L 43; Res. 810 Pierre St.

IDA ETHEL RIGNEY, B. S.,

Instructor in Domestic Science.⁶

B. S., Kansas State Agricultural College, 1909; Dietitian, Ensworth Hospital, St. Joseph, Missouri, 1909-1910; Instructor, Wichita (Kansas) High School, 1910-1912; Assistant in Domestic Science, Kansas State Agricultural College, 1912-1913; Instructor in Domestic Science, *ibid.*, 1913—. Office L 43; Res. 1207 Poyntz Ave.

INA EMMA HOLROYD, B. S.,

Assistant in Mathematics.

B. S., Kansas State Agricultural College, 1897; Graduate, Kansas State Normal School, 1899; Graduate Student, Harvard University, Summer School, 1905; Graduate Student, Cornell University, Summer School, 1911; Assistant in Mathematics, Kansas State Agricultural College, 1900—. Office A 72; Res. 1001 Moro St.

AMANDA KATHARIN TINKEY,

Loan Assistant in Library.

Student, Oskaloosa College (Iowa), 1878-1879; Instructor, Smith Center Schools, 1887-1889 and 1893-1903; Student, Campbell College, Summer, 1890; Assistant Librarian, Kansas State Agricultural College, 1908-1911; Loan Assistant in Library, *ibid.*, 1911—. Office F 32; Res. 1230 Laramie St.

6. Effective September 1, 1913.

CHARLES YOST,

Assistant in Machine Shop.

Assistant in Heat and Power Department, Kansas State Agricultural College, 1905-1910; Foreman of Boiler Room, *ibid.*, 1910-1912; Assistant in Machine Shop, *ibid.*, 1912—. Office S 34; Res. 1230 Laramie St.

JOHN THOMPSON PARKER,

Assistant in Woodwork.

Student, Lakin High School, 1897; Graduate, Apprentice Course in Woodwork, Kansas State Agricultural College, 1902; Carpenter, 1902-1904; Farmer, 1904-1905; Assistant in Woodwork, Kansas State Agricultural College, 1906—. Office S 23; Res. 926 Vattier St.

HUGH OLIVER,

Assistant in Heat, Water and Gas Distribution.

Apprentice, Heat and Power Department, Kansas State Agricultural College, 1902-1903; Assistant in Heat and Power Department, *ibid.*, 1906-1912; Assistant in Heat, Water and Gas Distribution, *ibid.*, 1912—. Office S 34; Res. 1126 Kearney St.

JESSIE ANNABERTA REYNOLDS, A. B.,

Assistant in History and Civics.

A. B., University of Kansas, 1905; B. S., Kansas State Agricultural College, 1906; Graduate Student, University of Kansas, Summers, 1905 and 1906; Graduate Student, University of Chicago, Summers, 1907 and 1910; Travel-study in Europe, Summers, 1909 and 1912; Assistant in History and Civics, Kansas State Agricultural College, 1906—. Office F 3; Res. 129 Anderson Ave.

CHESTER ALLEN ARTHUR UTT, M. S.,

Assistant in Food Analysis.

B. S., Cornell College, 1903; Graduate Student, State University of Iowa, 1903-1904; Instructor, Keokuk (Iowa) High School, 1904-1907; Graduate Student, State University of Iowa, Summer, 1907; M. S., Cornell College, 1909; Assistant in Food Analysis, Kansas State Agricultural College, 1907—; Assistant Chemist, Kansas State Board of Health, 1907—; Assistant Chemist, Kansas State Dairy Commission, 1907—. Office W 29; Res. 1209 Vattier St.

ANNA WILKINSON GORDON,⁵ A. B.,*Assistant in History and Civics.*

A. B., Iowa College, 1904; Instructor, Public Schools, Iowa, 1904-1905; Graduate Student, University of Chicago, Summer, 1910; Assistant in History and Civics, Kansas State Agricultural College, 1907-1913.

CLAUDE CARROLL CUNNINGHAM, B. S.,

Assistant in Farm Demonstrations.

B. S., Kansas State Agricultural College, 1903; Graduate Student, *ibid.*, 1904; Graduate Student, Cornell University, 1906; Special Assistant in Agronomy, Kansas State Agricultural College, 1907-1908; Assistant in Agronomy, Fort Hays Branch Experiment Station, 1908-1911; Assistant in Farm Demonstrations, Kansas State Agricultural College, 1912—. Office Ag 202; Res. 1018 Laramie St.

BURTON SYLVESTER ORR, B. S.,

Assistant in Power and Experimental Engineering, Superintendent of Power Plant.

B. S., Kansas State Agricultural College, 1907; in Engineering Department, Swift and Company, St. Joseph, Missouri, 1907-1908; Assistant in Mechanical Engineering, Kansas State Agricultural College, 1908-1910; Assistant in Power and Experimental Engineering, *ibid.*, 1910—; Superintendent of Power Plant, *ibid.*, 1912—. Office E 27; Res. 1010 Osage St.

5. Resigned.

ELMER JOHNSON, B. S.,

Assistant in Power and Experimental Engineering.

B. S., Kansas State Agricultural College, 1908; Assistant in Mechanical Engineering, *ibid.*, 1908-1910; Assistant in Power and Experimental Engineering, *ibid.*, 1910—. Office E 32; Res. 1010 Osage St.

RAYMOND CLIFFORD WILEY, B. S.,

Assistant Chemist, Agricultural Experiment Station.

B. S., Oklahoma College of Agriculture and Mechanic Arts, 1905; Assistant Chemist, Maryland Agricultural Experiment Station, 1905-1908; Assistant Chemist, Agricultural Experiment Station, Kansas State Agricultural College, 1908—. Office C 3; Res. 711 Humboldt St.

THOMAS POWELL HASLAM, B. S.,

Assistant in Veterinary Medicine, Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1908; Assistant Instructor in Chemistry, University of Kansas, 1908-1909; M. S., *ibid.*, 1910; Assistant in Veterinary Medicine, Agricultural Experiment Station, 1909—. Office V 2; Res. 628 N. Manhattan Ave.

AMY ALENA ALLEN, B. S.,

Assistant in Printing.

Apprentice in Department of Printing, Kansas State Agricultural College, Summer, 1900; Student Assistant, *ibid.*, 1901-1904; B. S., Kansas State Agricultural College, 1904; Proof-reader, Department of Printing, *ibid.*, 1904-1909; Assistant in Printing, *ibid.*, 1909—. Office K 28; Res. 1452 Fairchild Ave.

JESSIE GULICK,

Assistant Cataloguer in Library.

Instructor, Kansas Public Schools, 1899-1901 and 1903-1905; Instructor, Virginia Public Schools, 1901-1903; Chief Clerk, Division of College Extension, Kansas State Agricultural College, 1907-1909; Assistant in Library, *ibid.*, 1909-1911; Assistant Cataloguer in Library, *ibid.*, 1911—. Office F 28; Res. 1622 Osage St.

ADA MARIE BAUM,

Assistant in Music.

Student, Chicago Musical College, 1899 and 1903-1904; Assistant in Music, Kansas State Agricultural College, 1909—. Office M 29; Res. 822 Poyntz Ave.

ETHEL KATE MAY PING,

Assistant in Music.

Graduate, Sherwood Music School, Chicago, 1909; Assistant in Music, Kansas State Agricultural College, 1909—. Office M 52; Res. 611 Humboldt St.

DEAN HUMBOLDT ROSE,⁷ A. M.,

Assistant in Botany.

A. B., University of Kansas, 1904; A. M., Washington University (St. Louis), 1905; Principal, Smith Center High School, 1905-1906; Graduate Student, University of Chicago, Summer Session, 1906; Instructor in Biology, Manual Training High School of Washington University, 1906-1909; Assistant in Botany, Kansas State Agricultural College, 1909—. Office H 54; Res. 1819 Humboldt St.

7. Absent on leave, year 1912-1913.

MADGE KAY,⁵ S. B.,*Assistant in Mathematics.*

Principal of North Schools, Broken Bow, Nebraska, 1903-1904; Graduate, Nebraska State Normal Schools, 1905; Principal, O'Neill (Nebraska) High School, 1905-1906; Superintendent, Atkinson (Nebraska) Public Schools, 1906-1907; S. B., University of Chicago, 1908; Instructor in Mathematics, Chicago City Schools, 1908-1909; Graduate Student, University of Chicago, Summers, 1908, 1909, 1910; Ed. B., Nebraska State Normal School, 1911; Student, University of Chicago Law School, Summer, 1911; Assistant in Mathematics, Kansas State Agricultural College, 1909-October 2, 1912.

CHARLOTTE AUGUSTA MORTON,⁷ B. S.,*Assistant in Drawing.*

B. S., Kansas State Agricultural College, 1908; Assistant in Drawing, *ibid.*, 1909—. Office A 58; Res. 428 Houston St.

JOHN WILLARD CALVIN, B. S.,

Assistant Chemist, Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1906; Graduate Student and Student Assistant in Department of Chemistry, *ibid.*, 1906-1908; Assistant Expert in Animal Nutrition, United States Department of Agriculture, and Assistant in Animal Nutrition, Pennsylvania State College, 1908-1910; Assistant Chemist (Animal Nutrition), Agricultural Experiment Station, Kansas State Agricultural College, 1910—. Office C 3; Res. 1524 Humboldt St.

ALANSON LOLA HALLSTED, B. S.,

Assistant in Dry Farming, in Coöperation with United States Department of Agriculture.

B. S., Kansas State Agricultural College, 1908; in General Farming and Coöperative Work with Agronomy Department, Kansas State Agricultural Experiment Station, 1904-1909; Special Agent, Bureau of Plant Industry, United States Department of Agriculture, 1909-1910; Assistant in Dry Farming in Coöperation with United States Department of Agriculture, Fort Hays Branch Agricultural Experiment Station, 1910—. Office and Res., Hays, Kansas.

CLARE LAVON BIDDISON, B. S.,

Assistant in Vocal Music.

B. S., Kansas State Agricultural College, 1907; Student Assistant in Music, *ibid.*, 1908-1909; Graduate Student, Cosmopolitan School of Music, Chicago, Summer, 1910; Assistant in Vocal Music, Kansas State Agricultural College, 1910—. Office M 30; Res. 1001 Humboldt St.

HOWARD McCUNE CHANDLER,⁵ B. S.,*Inspector of Construction, Fellow in Engineering.*

Draftsman, Tuttle and Pike, Kansas City, Missouri, 1900; Draftsman, Union Depot-Bridge and Terminal Railroad Company, Kansas City, Missouri, 1901; Draftsman, Kansas City, Mexico and Orient Railroad Company, 1902; B. S. in Mechanical Engineering, Kansas State Agricultural College, 1908; Mechanical Engineer and Draftsman, W. T. Garratt Company, San Francisco, California, 1903-1904; Draftsman, Honolulu (Hawaii) Iron Works Company, 1904-1907 and 1909-1910; Construction Engineer, Guanica (Porto Rico) Centrale Sugar Company, 1907-1908; Assistant Chief Engineer, Cane Sugar Factory, Plantation Oaxaqueña, Sta. Lucrecia, V. C. Mexico, 1908-1909; Assistant in Experimental Engineering, Kansas State Agricultural College, 1910-1912; Inspector of Construction, Fellow in Engineering, *ibid.*, 1912-November 20, 1912.

ELLERY FRANKLIN CHILCOTT, B. S.,

Superintendent Garden City Branch Agricultural Experiment Station.

B. S., South Dakota State College, 1906; Assistant in Dry Land Agriculture, United States Department of Agriculture, Edgeley (North Dakota), Amarillo (Texas), and Garden City (Kansas), 1906-1911; Superintendent, Garden City Branch Agricultural Experiment Station, 1911—. Office and Res., Garden City, Kansas.

5. Resigned.

7. Absent on leave, year 1912-1913.

ARTHUR ROY FEHN, PH. B.,
Assistant in Mathematics.

Ph. B., German Wallace College, 1903; Instructor in Mathematics, Park College Academy, 1904-1905; Assistant in Biology and Botany, Park College, 1905-1906; Principal, Argos (Indiana) High School, 1907-1908; Principal, Walnut (Illinois) High School, 1908; Assistant Superintendent, *ibid.*, 1909-1910; Graduate Student, University of Chicago, Summer and Fall, 1908, and Summers, 1909 and 1910; Assistant in Mathematics, Kansas State Agricultural College, 1910—.
Office A 70; Res. 714 Poyntz Ave.

ARTHUR LYNN HARRIS,
Assistant in Heat and Power.

Fireman, Kansas State Agricultural College, 1908-1909; Student, *ibid.*, 1909-1910; Assistant in Heat and Power, *ibid.*, 1910—.
Office S 34; Res. 616 Osage St.

ALBERT RICHARD LOSH, B. S.,
Assistant in Highway Engineering, Division of College Extension.

Instructor in Bureau of Education, Philippine Islands, 1904-1907; Student, Philippine School of Arts and Trades, 1906; B. S., Kansas State Agricultural College, 1910; Assistant in Highway Engineering, Division of College Extension, Kansas State Agricultural College, 1910—.
Office A 5; Res. 800 Fremont St.

OTTO MAURER,⁵
Research Assistant in Bacteriology.

Graduate, Koenigliche Oberrealschule, Heilbronn, Germany, 1907; Student, University of Wisconsin, 1907-1909; Assistant Bacteriologist, Pennsylvania Railroad Company, Altoona, Pennsylvania, 1909-1910; Research Assistant in Bacteriology, Agricultural Experiment Station, Kansas State Agricultural College, 1910-September 15, 1912.

CHARLES ERNEST MILLAR, B. S.,
Assistant Chemist,¹⁶ Agricultural Experiment Station.

B. S., University of Illinois, 1909; Assistant in Chemistry, *ibid.*, 1909-1910; Assistant Chemist, Illinois State Water Survey, 1910; Assistant in Chemistry, Kansas State Agricultural College, 1910; Assistant Chemist (Soil Analysis), Agricultural Experiment Station, *ibid.*, 1911—.
Office C 3; Res. 930 Vattier St.

GEORGE ELLSWORTH RABURN,⁷ A. B.,
Assistant in Physics.

Graduate, Kansas State Normal School, 1905; A. B., University of Michigan, 1907; Assistant in Physics, Kansas State Agricultural College, 1910—.
Office C 61; Res. 1609 Poyntz Ave.

FLOYD EMERA WILSON,⁷ B. S.,
Assistant in Power and Experimental Engineering.

B. S., Kansas State Agricultural College, 1910; Assistant in Gas Engineering, *ibid.*, 1910-1912; Assistant in Power and Experimental Engineering, *ibid.*, 1912—.
Office S 30; Res. 711 Osage St.

JOE GRIGSBY LILL,⁵ M. S.,
Assistant in Soils.

B. S., Kansas State Agricultural College, 1909; Graduate Student, *ibid.*, 1910-1911; M. S., *ibid.*, 1911; Assistant in Soils, *ibid.*, 1910-April 1, 1913.

5. Resigned. 7. Absent on leave, year 1912-1913.

16. Assistant in Soils after July 1, 1913.

NELL BEACH,

Assistant in Music.

Graduate, University School of Music, Ann Arbor, Michigan, 1905; Piano Instructor, Pawnee City (Nebraska) Academy, 1905-1909; Graduate Student and Assistant, University School of Music, Ann Arbor, Michigan, 1909-1910; Assistant in Music, Kansas State Agricultural College, 1910—.
Office M 53; Res. 601 Humboldt St.

FRANK CARL GUTSCHE, B. S.,

Assistant in Chemistry.

B. S., University of Minnesota, 1910; Night Chemist, Carver County Sugar Company, Chaska, Minnesota, Campaign of 1910; Assistant in Chemistry, Kansas State Agricultural College, 1911—.
Office C 64; Res. 815 Poyntz Ave.

HARLAN DAVID SMITH, B. S.,

Assistant in Industrial Journalism.

B. S., Kansas State Agricultural College, 1911; Assistant in Industrial Journalism, *ibid.*, 1911—.
Office K 51; Res. 626 Moro St.

BRUCE STEINHOFF WILSON, B. S.,

Assistant in Farm Demonstrations.

B. S., Kansas State Agricultural College, 1908; Farm Foreman, Kansas State Agricultural College, 1910-1911; Assistant in Agronomy and Foreman of Experimental Farm, *ibid.*, 1911-1912; Assistant in Farm Demonstrations, *ibid.*, 1912—.
Office Ag 202; Res. 520 N. Manhattan Ave.

DAVID GEORGE BLATTNER, B. S.,

Assistant in Physics.

B. S., Kansas State Agricultural College, 1911; Assistant in Physics, *ibid.*, 1911—.
Office C 57; Res. 1104 Vattier St.

ALBERT LOGAN BURNS,⁵ A. M.,*Assistant in Chemistry.*

A. B., Wabash College, 1909; Fellow in Chemistry, Ohio State University, 1909-1910; A. M., *ibid.*, 1911; Assistant in Chemistry, Kansas State Agricultural College, 1911-January 31, 1913.

WILLIAM FREDERICK DROGE, B. S.,

Deputy State Dairy Commissioner.

B. S., Kansas State Agricultural College, 1910; Graduate Student, *ibid.*, 1910-1911; Deputy State Dairy Commissioner, 1911—.
Office X; Res. 108 S. Juliette Ave.

FORREST FAYE FRAZIER,

Assistant in Civil Engineering.

Student, Liberal Arts, Miami University, 1905-1907; Student, Engineering Course, Ohio State University, 1907-1910; Graduate, *ibid.*, 1910; Assistant in Engineering Corps, Cincinnati, Hamilton and Dayton Railway, Summer, 1909; Inspector of Concrete Bridges, *ibid.*, 1910; Assistant Superintendent on Excavation and Fill, with Railroad Contractors, 1910-1911; Assistant Engineer on Construction, Pennsylvania Railway, 1911; Assistant in Civil Engineering, Kansas State Agricultural College, 1911—.
Office E 32; Res. 718 Vattier St.

JOHN B GINGERY,⁵ D. V. M.,*Assistant in Veterinary Medicine.*

D. V. M., Kansas State Agricultural College, 1910; in Quarantine Field Work, Bureau of Animal Industry, United States Department of Agriculture, Summer, 1910; Assistant in Field Work, Kansas Live-stock Sanitary Commissioner, 1910-1911; Assistant in Veterinary Medicine, Kansas State Agricultural College, 1911—.

5. Resigned.

HELEN VICTORIA HOBBS,

Assistant in Domestic Art.

Student, Stout Institute, 1909-1911; Assistant in Domestic Art, Kansas State Agricultural College, 1911—. Office L 64; Res. 512 Houston St.

NETTIE BERTHA HUMFELD,

Assistant in Domestic Art.

Instructor in Domestic Art, Manual Training High School, Kansas City, Missouri, 1904-1909; Student, Teachers' College, Columbia University, 1909-1910; Student, University of Missouri, 1910-1911; Assistant in Domestic Art, *ibid.*, 1910-1911; Student, University of Missouri, Summer, 1912; Special Diploma in Domestic Art, Teachers' College, Columbia University, 1912; Assistant in Domestic Art, Kansas State Agricultural College, 1911—. Office L 65; Res. 1001 Humboldt St.

JOHN GROVER JACKLEY, D. V. M.,

Assistant in Bacteriology.

Research Assistant in Bacteriological Laboratory of Pennsylvania State Live Stock Sanitary Board, Philadelphia, 1908-1909; D. V. M., University of Pennsylvania, 1910; Demonstrator and Instructor in Pathological Histology, *ibid.*, 1910-1911; Assistant in Bacteriology, Kansas State Agricultural College, 1911—. Office V 52; Res. 617 Houston St.

DAVID ERNEST LEWIS, B. S.,

Assistant in Horticulture.

B. S., Kansas State Agricultural College, 1910; Graduate Student, *ibid.*, 1910-1911; Assistant in Horticulture, *ibid.*, 1911—. Office H 32; Res. 1020 Osage St.

VERA VIRGINIA MUTCHELER, B. S.,

Assistant in Domestic Art.

B. S., University of Wisconsin, 1911; Assistant in Domestic Art, Kansas State Agricultural College, 1911—. Office L 64; Res. 512 Houston St.

BURR HOWEY OZMENT,

Band Leader.

Band-master, Baker University, 1900-1903; Band-master, University of Missouri, 1904-1910; Band Leader, Kansas State Agricultural College, 1911—. Office N 35; Res. 714 Houston St.

GROVER MARTIN PRATT, B. AR.,

Assistant in Architecture.

B. Ar., Syracuse University, 1911; Assistant in Architecture, Kansas State Agricultural College, 1911—. Office A 55; Res. 617 Houston St.

MARY EDNA SIMMONS, B. S.,

Lecturer on Domestic Science, Division of College Extension.

Instructor, Kansas Public Schools, 1895-1903; B. S., Kansas State Agricultural College, 1911; Lecturer on Domestic Science, Division of College Extension, *ibid.*, 1911—. Office A 37; Res. 1019 Humboldt St.

HAL SMITH,⁵

Assistant in Gas Engineering.

Assistant in Electrical Signal and Interlocking Department, Union Pacific Railroad Company, 1903-1906; Supervisor of Signals, *ibid.*, 1906-1911; Assistant in Mechanical Engineering, Kansas State Agricultural College, 1911-1912; Assistant in Gas Engineering, *ibid.*, 1912-January 14, 1913.

5. Resigned.

WARREN LALE BLIZZARD, B. S.,

Assistant in Animal Husbandry.

B. S., Kansas State Agricultural College, 1910; Manager of Stock Farm, 1910-1911; Assistant in Animal Husbandry, Kansas State Agricultural College, October, 1911—. Office Ag 1; Res. 930 Laramie St.

GRACE EMILY DERBY, A. B.,

Reference Librarian.

A. B., Western College for Women, Oxford, Ohio, 1905; Graduate Student, Illinois State Library School, 1905-1906; Reference Assistant in Library, University of Illinois, 1906-1907; Librarian, Western College for Women, 1907-1911; Reference Librarian, Kansas State Agricultural College, 1911—. Office F 32; Res. 426 Leavenworth St.

PERRY VAN EWING, B. S. A.,

Assistant to the President.

J. Ogden Armour Scholar, Ohio State University, 1909-1910; Student Assistant in Animal Husbandry, *ibid.*, 1910-1911; B. S. A., *ibid.*, 1911; Graduate Student, *ibid.*, 1911; Secretary and Agriculturalist, Cottage Hill Farm, Ravenna, Ohio, 1911; Assistant to the President, Kansas State Agricultural College, January 1, 1912—. Office A 30; Res. 901 Laramie St.

DUNCAN STUART, B. S.,

Assistant to the Dean of the Division of Agriculture, Assistant in Experimental Dairying.

Graduate, McGill Normal School (Montreal), 1892; Graduate, Dairy School, University of Vermont, 1894; Dairymen, Vermont Experiment Station, 1894; B. S., University of Vermont, 1898; Assistant, Vermont Experiment Station, 1899; Graduate Student, University of Vermont, 1899-1900; Assistant in Dairy School, *ibid.*, 1895-1902; Assistant in Bureau of Chemistry, United States Department of Agriculture, 1901; Assistant in Dairy Division, *ibid.*, 1902-1911; Assistant to the Dean of the Division of Agriculture, Kansas State Agricultural College, January 1, 1912—. Office Ag 106; Res. 1025 Bluemont Ave.

RAY IAMS THROCKMORTON, B. S.,

Assistant in Soils.

B. S., Pennsylvania State College, 1911; Assistant in Soils, Kansas State Agricultural College, February, 1912—. Office Ag 201; Res. 711 Humboldt St.

HILMER HENRY LAUDE,⁵ B. S.,*Assistant in Farm Crops.*

B. S., Kansas State Agricultural College, 1911; Graduate Student, *ibid.*, 1911-1912; Assistant in Farm Crops, *ibid.*, June, 1912-April 15, 1913.

AGNES BOUTON COOPER,⁵ A. B.,*Cataloguer in Library.*

A. B., University of Illinois, 1910; Student, Library School, University of Illinois, 1909-1910; Cataloguer in Library, Miami University, 1910-1912; Cataloguer in Library, Kansas State Agricultural College, August, 1912-May 1, 1913.

ASHER EULESTA LANGWORTHY, PH. C.,

State Feeding-Stuffs Inspector.

Ph. C., University of Kansas, 1901; in Commercial Work, 1901-1912; State Feeding-stuffs Inspector, Agricultural Experiment Station, Kansas State Agricultural College, August 15, 1912—. Office Ag 109; Res. 815 Poyntz Ave.

5. Resigned.

WALTER GOLDSBERRY ALLEE, B. S.,

Assistant in Physics.

B. S., Earlham College, 1903; Instructor, Parke County (Indiana) Public Schools, 1903-1905; Principal of Ward School and Director of Athletics, Rockville (Indiana) City Schools, 1905-1907; Instructor and Director of Athletics, Hammond (Indiana) High School, 1908-1911; Graduate Student, University of Chicago, Summers, 1911 and 1912; Assistant in Physics, Kansas State Agricultural College, 1912—.

Office C 63; Res. 712 Poyntz Ave.

MYRON RALPH BOWERMAN, B. S.,

Assistant in Mechanical Drawing and Machine Design.

B. S., Michigan State Agricultural College, 1909; Draftsman, Western Electric Company, Summer, 1909; Assistant in Mechanical Engineering, Kansas State Agricultural College, 1909-1910; Draftsman, Capital Iron Works, Topeka, 1910-1911; Draftsman, Phillips, Long and Company, Chicago, Illinois, 1911; Draftsman Hanke Iron Works, ibid., 1911-1912; Assistant in Mechanical Drawing and Machine Design, Kansas State Agricultural College, 1912—.

Office S 63; Res. 1105 Vattier St.

CLARA LOUISE COITH, B. P.,

Assistant in Drawing.

B. P., Illinois State Normal University, 1906; Supervisor of Drawing, Riverside (Illinois) Public Schools, 1906-1908; Graduate Student, Pratt Institute, Brooklyn, New York, 1909-1910; Principal, Greenleaf (Kansas) High School, 1911-1912; Assistant in Drawing, Kansas State Agricultural College, 1912—.

Office A 68; Res. 815 Fremont St.

JOHN RALPH COOPER,⁵ B. S.,

Assistant in Horticulture.

B. S., Kansas State Agricultural College, 1912; Assistant in Horticulture, ibid., September 1 to October 15, 1912.

LEILA DUNTON, M. S.,

Assistant in Milling Industry.

B. S., Kansas State Agricultural College, 1910; M. S., ibid., 1912; Assistant in Milling Industry, ibid., 1912—.

Office Ag 115; Res. 804 Moro St.

LOUISE FEWELL,

Assistant in Domestic Art.

Student, Winthrop Normal and Industrial College, Rock Hill, South Carolina, 1907-1911; Student, Teachers' College, Columbia University, 1911-1912; Assistant in Domestic Art, Kansas State Agricultural College, 1912—.

Office L 65; Res. 1021 Houston St.

OLIVER MORRIS FRANKLIN, D. V. M.,

Assistant in Veterinary Medicine.

D. V. M., Kansas State Agricultural College, 1912; Assistant in Veterinary Medicine, ibid., 1912—.

Office V 2; Res. 1630 Houston St.

HELEN LOUISE GREEN,

Assistant in Domestic Science.

Graduate Student in Household Economics, Simmons College, 1910-1912; Instructor of Evening Classes, North Bennett Street Industrial School, Boston, Massachusetts, 1911-1912; Assistant in Domestic Science, Kansas State Agricultural College, 1912—.

Office L 42; Res. 910 Fremont St.

5. Resigned.

FRED REEDER HESSER, B. S.,

Assistant State Engineer, Division of College Extension.

B. S. in Civil Engineering, University of Kansas, 1910; Redman with Union Pacific Railroad Company, 1907; City Engineer, Beloit, and County Surveyor, Mitchell County, Kansas, 1910-1912; Assistant State Engineer, Division of College Extension, Kansas State Agricultural College, 1912—.
Office A 5; Res. 617 Houston St.

LINDA LOUISE HIMMELEIN,

Assistant in Domestic Art.

Graduate, Normal Domestic Art Course, Drexel Institute, 1912; Assistant in Domestic Art, Kansas State Agricultural College, 1912—.
Office L 62; Res. 1021 Houston St.

CHARLES FRANKLIN HOLLADAY,

Assistant in Physical Education.

Graduate, Commercial College, Baker University, 1908; Student, Academic Department, ibid., 1908-1910; Student Assistant in Gymnasium, ibid., 1907-1910; Assistant in Physical Education, Kansas State Agricultural College, 1912—.
Office N 37; Res. 171 Anderson Ave.

PERRY RAY IREY,

Assistant in Blacksmithing.

Student Assistant, Agricultural Experiment Station, Kansas State Agricultural College, 1910-1911; Assistant in Blacksmithing, ibid., 1912—.
Office S 38; Res. 1002 Vattier St.

HELEN M JONES, B. S.,

Assistant in Domestic Science.

B. S., Iowa State College, 1910; Instructor in Home Economics, Beatrice (Nebraska) High School, 1910-1912; Assistant in Domestic Science, Kansas State Agricultural College, 1912—.
Office L 42; Res. 512 Houston St.

WALTER JACOB KING, B. S.,

Fellow in Experimental Engineering.

B. S., Kansas State Agricultural College, 1909; Superintendent of Trades School, Kansas State Industrial Reformatory, Hutchinson, 1909-1912; Fellow in Engineering, Kansas State Agricultural College, 1912—.
Office E 31; Res. 1616 Fairchild Ave.

ADAH LEWIS, M. S.,

In Charge of Girls' Home Economics Clubs, Division of College Extension.

B. S., Kansas State Agricultural College, 1907; M. S., ibid., 1909; Temporary Assistant in Chemistry, 1907-1911; Dietitian, Ottumwa (Iowa) City Hospital, Fall, 1911; in Charge of Girls' Home Economics Clubs, Division of College Extension, Kansas State Agricultural College, 1912—.
Office A 35; Res. College Campus.

JOHN D LEWIS, B. S.,

Assistant in Animal Husbandry.

Student, Edinboro (Pennsylvania) State Normal School, 1906; Instructor, Pennsylvania Public Schools, 1906-1907; B. S., Pennsylvania State College, 1912; Assistant in Animal Husbandry, Kansas State Agricultural College, 1912—.
Office Ag 1; Res. 815 Poyntz Ave.

CHARLES ALBERT LODGE, JR., B. S.,

Assistant in Botany.

B. S., Massachusetts Agricultural College, 1912; Assistant in Botany, Kansas State Agricultural College, 1912—.
Office H 54; Res. 714 Poyntz Ave.

JAMES WALKER McCOLLOCH, B. S.,

Assistant in Entomology.

Special Field Agent, Department of Entomology, Kansas State Agricultural College, 1910-1912; B. S., *ibid.*, 1912; Assistant in Entomology, *ibid.*, 1912—. Office F 55; Res. 1201 Blumont Ave.

ADOLPH HENRY MEYER, B. S.,

Assistant in Mathematics.

B. S., Columbia University, 1911; Assistant in Mathematics, Kansas State Agricultural College, 1912—. Office A 54; Res. 623 Humboldt St.

RUTH KATHERINE PETERSEN,

Assistant in Domestic Art.

Student, Stout Institute, 1910-1912; Assistant in Domestic Art, Kansas State Agricultural College, 1912—. Office L 64; Res. 1021 Houston St.

WILLIAM HENRY SANDERS, B. S.,

Assistant in Power and Experimental Engineering.

B. S., Kansas State Agricultural College, 1890; Carpenter, Lake Worth, Florida, 1890-1893; Engineer and Contractor, Reclamation Work, Palm Beach, Florida, 1893-1895, 1900-1902; Marine Steam and Gas Engineer, Lake Worth, Florida, 1895-1900; Foreman of Construction Work, West Palm Beach, Florida, 1902-1905; Marine Gas Engineer, Railway Extension, Miami, Florida, 1905-1906; in Dredging Work and Canal Construction, Florida, 1907-1912; Assistant in Power and Experimental Engineering, Kansas State Agricultural College, 1912—. Office E 3; Res. 826 Osage St.

FLORENCE SNELL, B. S.,

Lecturer on Domestic Science, Division of College Extension.

Instructor, Kansas Public Schools, 1905-1908; B. S., Kansas State Agricultural College, 1911; Instructor in Domestic Science and Art, Atchison County High School, 1911-1912; Lecturer on Domestic Science, Division of College Extension, Kansas State Agricultural College, 1912—. Office A 35; Res. 1021 Houston St.

RICHARD ARTHUR STUDHALTER,⁵ A. B.,

Assistant in Botany.

Student Assistant in Botany, University of Texas, 1910-1912; A. B., *ibid.*, 1912; Assistant in Botany, Kansas State Agricultural College, 1912-January 1, 1913.

EVA BERNIECE WELCH, B. S.,

Assistant in Domestic Science.

Graduate, Missouri Northwest Normal School, 1908; Instructor, Stanberry (Missouri) High School, 1908-1910; Farmers' Institute Lecturer, University of Missouri, 1912; B. S., *ibid.*, 1912; Assistant in Domestic Science, Kansas State Agricultural College, 1912—. Office L 42; Res. 1021 Houston St.

ANNA WALLER WILLIAMS, A. M.,

Assistant in Domestic Science.

A. B., University of Illinois, 1907; A. M., *ibid.*, 1912; Assistant in Domestic Science, Kansas State Agricultural College, 1912—. Office L 42; Res. 909 Fremont St.

WILLIAM ARMFIELD BOYS, B. S.,

District Demonstration Agent, West Central Kansas, Division of College Extension.

B. S., Kansas State Agricultural College, 1904; Farmer, Lee's Summit, Missouri, 1904-1906; Farmer, Goodland, Kansas, 1906-1911; Assistant Cerealist, University of California, 1911-1912; District Demonstration Agent, West Central Kansas, Division of College Extension, Kansas State Agricultural College, October, 1912—.

5. Resigned.

ARTHUR J. LEWIS,⁵ A. M.,
Assistant in Mathematics.

A. B., University of Denver, 1907; Instructor, North Denver (Colorado) High School, 1907-1908; Head of Department of Mathematics, State Normal School, Albion, Idaho, 1908-1912; A. M., University of Denver, ——; Assistant in Mathematics, Kansas State Agricultural College, November 1, 1912-January 1, 1913.

VIRGIL EMMITT MILLER, B. S.,
Assistant in Electrical Engineering.

Student, Hollywood Polytechnic Institute, Los Angeles, California, Spring Semester, 1909; Meterman with Pacific Light and Power Company, Los Angeles, Summer, 1909; Student Electrician, Kansas State Agricultural College, 1909-1912; B. S., ibid., 1912; Assistant in Electrical Engineering, ibid., January 1, 1913—. Office C 33; Res. 1116 Fremont St.

ARTHUR ALEXANDER BAXTER,¹⁰ B. S.,
Assistant in Woodwork.

Apprentice in Woodwork, Kansas State Agricultural College, 1909-1913; Assistant in Woodwork, ibid., Winter Term, 1913.

SADIE ELIZABETH ROSS,
Assistant in Millinery.

Associate in Domestic Economy, Lewis Institute, Chicago, Illinois, 1912; Assistant in Domestic Art, ibid., 1912; Instructor in Domestic Science and Art, Olivet Institute, Chicago, Summer, 1912; Assistant in Millinery, Kansas State Agricultural College, Winter Term, 1913.

GEORGE P STACK,¹⁰ B. S.,
Assistant in Crops.

B. S., Kansas State Agricultural College, 1911; Kansas State Soil Survey, 1912; Assistant in Agronomy, Kansas State Agricultural College, January 1, 1913—. Office Ag 308; Res. 727 Humboldt St.

HARLEY JAMES BOWER,¹¹ B. S., A. M.,
District Demonstration Agent, Southeastern Kansas, Division of College Extension.

B. S., Kansas State Agricultural College, 1910; Graduate Student and Assistant in Soils, Ohio State University, 1910-1912; A. M., ibid., 1912; Agronomist, Connecticut Experiment Station, 1912-1913; District Demonstration Agent, Southeastern Kansas, Division of College Extension, Kansas State Agricultural College, February, 1913—.

GEORGE SELICK KNAPP,
Assistant in Gas Engineering.

Assistant in Machine Shops, Highland Park College, 1908-1910; Instructor in Steam and Gas Engines, ibid., 1910-1913; Assistant in Gas Engineering, Kansas State Agricultural College, February 15, 1913—. Office E 3; Res. 714 Poyntz Ave.

ROLLA WOODS MILLER, A. B.,
Assistant in Chemistry.

A. B., Wabash College, 1913; Assistant in Chemistry, ibid., 1911-1913; Assistant in Chemistry, Kansas State Agricultural College, February 25, 1913—. Office W 26; Res. 714 Poyntz Ave.

GRAYSON BELL MCNAIR, B. S.,
Assistant in Mathematics.

B. S., Purdue University, 1908; Assistant to Consulting Engineer, Louisville, Kentucky, 1908-1909; in Charge of Transformer Testing Department, Wagner Electric Manufacturing Company, St. Louis, Missouri, 1909-1913; Assistant in Mathematics, Kansas State Agricultural College, May 1, 1913—. Office A 54; Res. 520 Poyntz Ave.

5. Resigned.

10. Temporary appointment.

11. In coöperation with the United States Department of Agriculture.

JOHN CORNELIUS CHRISTENSEN, B. S.,
Financial Secretary.

B. S., Kansas State Agricultural College, 1894; Instructor, Kansas Public Schools, 1894-1896; Graduate Student, University of Kansas, 1897; Bookkeeper and Office Clerk, 1898-1907; County Treasurer, Riley County, Kansas, 1903-1907; Office Clerk and Bank Cashier, 1907-1909; Deputy Bank Commissioner of Kansas, 1909-1911; Financial Secretary, Kansas State Agricultural College, 1911—.
Office A 28; Res. 625 Leavenworth St.

MARGARET ANNA BUTTERFIELD,
Secretary.

Instructor in Public Schools of Kansas and Nebraska, 1889-1903; Bookkeeper, Kansas State Agricultural College, 1904-1909; Secretary, *ibid.*, 1909—.
Office A 29; Res. 1114 Houston St.

MYRA MYRTLE NICHOLSON,
College Nurse.¹²

Student Nurse, Pueblo (Colorado) City and County Hospital, 1907; Head Nurse, Manhattan Hospital, 1910; Graduate Student, The Mayo Hospital, Rochester, Minnesota, Summer, 1911; College Nurse, Kansas State Agricultural College, 1911—.
Office L 38; Res. 618 Fremont St.

WILLIAM RILEY LEWIS,
Custodian.

Head Janitor, Kansas State Agricultural College, 1899-1908; Custodian, *ibid.*, 1908—.
Office A 47; Res. on College Campus.

GUY DAVID NOEL, B. S.,
Foreman in Charge, Dodge City Branch Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1909; Assistant, South Dakota Agricultural Experiment Station, 1909; Instructor, Olathe High School, 1909-1910; Instructor in Science, Dickinson County High School, 1910-April, 1911; Foreman in Charge, Dodge City Branch Agricultural Experiment Station, April 1, 1911—.
Office and Res., Dodge City, Kansas.

FRANCIS JOHN TURNER,
Foreman, Ogallah Branch Agricultural Experiment Station.

With Dillon Nursery Company, McLouth, Kansas, 1902-1904; Farmer and Fruit Grower, 1904-1908; Student, Kansas State Agricultural College, 1908-1909; Foreman, Ogallah Branch Agricultural Experiment Station, 1909—.
Office and Res., Ogallah, Kansas.

CHARLES ELMER CASSEL, B. S.,
Foreman, Tribune Branch Agricultural Experiment Station.

B. S., Kansas State Agricultural College, 1910; Foreman, Tribune Branch Agricultural Experiment Station, 1912—.
Office and Res., Tribune, Kansas.

EDWARD CLAEREN, Commissary Sergeant U. S. A. (Retired),
Assistant to the Commandant.
Commissary Sergeant, U. S. A. (Retired); Assistant to the Commandant, Kansas State Agricultural College, 1910—.
Office N 29; Res. 1125 Poyntz Ave.

FRANK BAXTER LAWTON, B. S.,
Farm Foreman.
B. S., Kansas State Agricultural College, 1912; Farm Foreman, *ibid.*, 1912—.
Office and Res., R. R. 8.

12. This office is maintained by student medical fees.

ARCHIE KANE,¹³
Dairy Herdsman.

CYRUS EARL BUCHANAN,¹⁴
Dairy Herdsman.

NORTON LEWIS HARRIS,
Superintendent of Poultry.

LESLIE ROSS,
Herdsman.

13. Resigned October 1, 1912.

14. Beginning October 1, 1912.

Agricultural Experiment Station

Officers of the Station

H. J. WATERS, *President of the College.*

ADMINISTRATION—

W. M. JARDINE, Director.
J. T. WILLARD, Vice Director.
DUNCAN STUART, Assistant to the Director.
ETHEL ROBBINS, Executive Clerk.

AGRONOMY—

L. E. CALL, in Charge.
A. H. LEIDIGH, Assistant in Crops.
E. G. SCHAFER, Assistant in Crops.
C. C. CUNNINGHAM, Assistant in Coöperative Experiments.
B. S. WILSON, Assistant in Coöperative Experiments.
R. I. THROCKMORTON, Assistant in Soils.
_____, Assistant in Farm Mechanics.
_____, Assistant in Soils.
_____, Assistant in Soils.
F. E. LAWTON, Foreman of Experimental Farm.

ANIMAL HUSBANDRY—

W. A. COCHEL, in Charge.
C. W. MCCAMPBELL, Assistant in Experimental Horse Feeding.
TURNER R. H. WRIGHT, Assistant in Animal Nutrition.
P. V. EWING, Assistant in Animal Husbandry.
CLAUDE M. VESTAL, Assistant in Animal Husbandry.
W. L. BLIZZARD, Assistant in Animal Husbandry.
LESLIE ROSS, Herdsman.

BACTERIOLOGY—

L. D. BUSHNELL, in Charge.
O. W. HUNTER, Assistant in Bacteriology.
J. G. JACKLEY, Assistant in Bacteriology.

BOTANY AND PLANT BREEDING—

H. F. ROBERTS, in Charge.
R. A. JEHLE, Assistant in Plant Pathology.
D. H. ROSE, Assistant in Plant Breeding.
E. C. MILLER, Assistant in Plant Breeding.

CHEMISTRY—

J. T. WILLARD, in Charge.
C. O. SWANSON, General Chemical Investigations.
J. W. CALVIN, Assistant in Animal Nutrition.
C. E. MILLAR, Assistant in Soil Analysis.
R. C. WILEY, Feeding-stuffs Analyst.

DAIRY HUSBANDRY—

O. E. REED, in Charge.
G. S. HINE, Dairy Commissioner, Assistant in Special Field Investigations.
WM. F. DROGE, Deputy Dairy Commissioner.
DUNCAN STUART, Assistant in Special Field Investigations.
A. W. RUDNICK, Assistant in Dairy Manufactures.
J. B. FITCH, Assistant in Dairy Production.
C. E. BUCHANAN, Dairy Herdsman.

ENTOMOLOGY—

GEORGE A. DEAN, in Charge.
J. H. MERRILL, Assistant in Fruit Insect Investigations.
_____, Assistant in Staple Crop Insect Investigations.
J. W. McCOLLOCH, Assistant in Staple Crop Insect Investigations.

FORESTRY—

C. A. SCOTT, in Charge.

HORTICULTURE—

ALBERT DICKENS, in Charge.
D. E. LEWIS, Assistant in Horticulture.

MILLING INDUSTRY—

L. A. FITZ, in Charge.
LEILA DUNTON, Assistant in Milling and Baking Investigations.
E. A. LANGWORTHY, Feed Inspector.

POULTRY HUSBANDRY—

W. A. LIPPINCOTT, in Charge.
N. L. HARRIS, Superintendent of Poultry Plant.

VETERINARY SCIENCE—

F. S. SCHOENLEBER, in Charge.
L. W. GOSS, Assistant in Histology.
T. P. HASLAM, Assistant in Pathology.
R. R. DYKSTRA, Assistant in Veterinary Medicine.
J. H. BURT, Assistant in Veterinary Medicine.
O. M. FRANKLIN, Assistant in Veterinary Medicine.
B. R. ROGERS, Assistant in Veterinary Medicine.
J. B. GINGERY, Assistant in Hog Cholera Serum Manufacture.

ZOOLOGY—

R. K. NABOURS, in Charge.
J. W. SCOTT, Assistant in Animal Parasite Investigations.

Fort Hays Branch Station

GEORGE K. HELDER, Superintendent.
A. L. HALLSTED,¹¹ Assistant in Dry Farming.
F. A. KIENE,¹¹ Assistant in Cereal Investigations.
ROBERT E. GETTY,¹¹ Assistant in Forage Crop Investigations.
R. E. KARPER, Assistant in Cereal Investigations.
E. Q. PERRY, Assistant in Dry Farming.

Garden City Branch Station

E. F. CHILCOTT, Superintendent.
J. G. LILL,¹¹ Assistant in Dry Farming.
H. E. MURDOCK,¹¹ Assistant in Irrigation Investigations.

Dodge City Forestry Station

F. J. TURNER, Foreman.

Tribune Branch Station

C. E. CASSEL, Foreman.

Office of Dairy Commissioner

GEO. S. HINE, Commissioner.
W. F. DROGE, Assistant Commissioner.

11. In coöperation with the United States Department of Agriculture.

Engineering Experiment Station

Officers of the Station

H. J. WATERS, *President of the College.*

ADMINISTRATION—

E. B. MCCORMICK, Director.
FANNY DALE, Secretary.

APPLIED MECHANICS AND HYDRAULICS—

R. A. SEATON, in Charge.
ELMER JOHNSON, Assistant in Strength of Materials.

ARCHITECTURE—

J. D. WALTERS, in Charge.
FRANK HARRIS, Assistant.

CHEMISTRY—

J. T. WILLARD, in Charge.
H. H. KING, Assistant.

CIVIL ENGINEERING—

L. E. CONRAD, in Charge.
F. F. FRAZIER, Assistant.

ELECTRICAL ENGINEERING—

J. O. HAMILTON,¹⁷ in Charge.
W. C. LANE, Assistant.

MACHINE DESIGN—

M. R. BOWERMAN, Assistant.

PHYSICS—

J. O. HAMILTON, in Charge.
G. E. RABURN, Assistant.

SHOP METHODS AND PRACTICE—

W. W. CARLSON, in Charge.

STEAM AND GAS ENGINEERING—

A. A. POTTER, in Charge of Steam and Gas Engineering.
B. S. ORR, Assistant in Power Engineering.
W. H. SANDERS, Assistant in Gas Engineering.

17. Following B. F. Eyer, who resigned January 1, 1918.

The College Cadet Corps

The following is a roster of the commissioned and noncommissioned officers of the Corps of Cadets of the Kansas State Agricultural College for the year 1912-1913:

COMMANDANT OF CADETS,
SECOND LIEUTENANT ROY ALISON HILL, Seventh U. S. Infantry,
Professor of Military Science and Tactics.

Assistant to the Commandant,
Commissary Sergeant EDWARD CLAEREN, U. S. A. (Retired).

Band Leader,
BURR HOWEY OZMENT.

CORPS ORGANIZATION.

C. A. LEECH, Major.	R. O. DEMING, Quartermaster Sergeant.
O. E. SMITH, Adjutant.	R. E. FREETO, Color Sergeant.
O. M. LOW, Quartermaster.	F. H. FREETO, Color Sergeant.
G. A. HOPP, Sergeant Major.	K. G. COFFMAN, Chief Trumpeter.

COMPANY A.

Captain:
A. P. Immenshuh.

Lieutenant:
Charles W. Giffin.

First Sergeant:
H. M. Fellows.

Sergeants:
G. L. Farmer.
Carl Stone.
W. Rutter.
C. Elder.
D. P. Ricord.
V. F. Stuewe.

Corporals:
R. J. Sedivy.
R. B. Myers.
H. A. Lindsley.
P. R. Lemly.
C. S. Wolgamott.
L. R. Sparks.

COMPANY B.

Captain:
J. C. Jones.

Lieutenant:
John Wise.

First Sergeant:
G. Tilbury.

Sergeants:
M. L. Gould.
U. L. Skourup.
W. A. Hagan.
G. H. Bunnel.
P. W. Cockerell.
E. J. Suydam.

Corporals:
T. H. Polack.
Julius Van Vliet.
D. R. Smith.
H. R. Sumner.
W. E. Deal.
O. L. Hubp.
J. E. Franz.

COMPANY C.

Captain: Paul Jackson.
Lieutenant: N. H. Davis.
First Sergeant: E. E. Thompson.
Sergeants:
 J. V. Baptist.
 P. Dryden.
 V. E. Bundy.
 G. L. Fitzgerald.
 W. Williams.
 A. W. Aicher.

Corporals:

J. Elliot.
 C. L. Slentz.
 A. L. Ford.
 H. R. Kidd.
 P. McGilliard.
 H. Weddle.

COMPANY D.

Captain: L. E. Hutto.
Lieutenant: J. W. Linn.
First Sergeant: J. V. Hepler.
Sergeants:
 W. J. Loomis.
 H. J. Hayes.
 C. C. Coleman.
 O. B. Burtis.
 J. W. Allen.

Corporals:

E. M. McClymond.
 H. S. Coith.
 Roscoe St. John.
 C. W. Gartrell.
 W. R. Jackson.

COMPANY E.

Captain: Ray Kerr.
Lieutenant: L. A. Richards.
First Sergeant: W. S. Calvert.
Sergeants:
 L. P. Whitehead.
 L. V. Cummings.
 L. Wilsey.
 W. Ramage.
 A. Nelson.
 L. N. Nabours.

Corporals:

H. A. Gunning.
 L. J. Lush.
 R. R. St. John.
 J. L. Usselman.
 Joe Reaugh.
 J. S. Hagan.

COMPANY F.

Captain: J. D. Colt.
Lieutenant: J. L. Hutchinson.
First Sergeant: E. B. Holmes.
Sergeants:
 G. Ansdell.
 E. W. Huston.
 J. T. Pearson.
 F. W. Johnson.
 C. P. Lillard.

Corporals:

J. M. McArthur.
 R. E. Ennefer.
 H. Ewers.
 G. B. Kepfield.
 R. J. Montgomery.

SIGNAL CORPS.

Lieutenant: F. T. Boise. *Sergeants:*
 C. A. Hooker.
 Fred Stephenson.

College Band

The following is a list of the College Band for the year 1912-1913:

BAND LEADER,

BURR HOWEY OZMENT.

Drum Major: G. C. SALISBURY. *Principal Musician:* S. L. REEVES.

Sergeants: E. C. Jones, R. J. Hanna, Homer McNamara, W. W. Keith,
Walter Smith, L. L. Smith, C. A. Davis.

Corporals: Fay Buck, G. S. McNamara, Fred Milner, W. B. Smith.

Piccolo:

L. G. Geisendorf.

Horns:

Walter Smith.

Homer McNamara.

Oboe:

H. H. McLean.

Trombones:

Charles Shaver.

R. C. Jones.

R. H. Chappell.

O. I. Markham.

W. L. Rynerson.

Clarionets:

W. W. Keith.

Leo L. Smith.

J. A. Meyer.

R. W. Taylor.

W. W. Smith.

Ben Robbins.

J. W. Stockebrand.

F. C. Clark.

Baritone:

S. L. Reeves.

Fay Buck.

Bassoon:

H. C. McKenney.

Bass:

J. C. Riney.

J. A. Stinson.

Arthur McArthur.

R. E. Stuewe.

Drums:

Jerry S. McNamara.

E. M. Moore.

Saxophones:

R. B. Howell.

H. A. Wagner.

History of the College

The Kansas State Agricultural College had its origin in the Bluemont Central College, an institution established at Manhattan under the control of the Methodist Episcopal Church of Kansas. The charter for this sectarian institution, approved February 9, 1858, provided for the establishment of a classical college, but contained the following interesting section:

"The said association shall have power and authority to establish, in addition to the literary departments of arts and sciences, an agricultural department, with separate professors, to test soils, experiment in the raising of crops, the cultivation of trees, etc., upon a farm set apart for the purpose, so as to bring out to the utmost practical results the agricultural advantages of Kansas, especially the capabilities of the high prairie lands."

The corner-stone of the new College was laid on May 10, 1859, and instruction began about a year later. On March 1, 1861, a bill passed the legislature establishing a State university at Manhattan, the Bluemont Central College building to be donated for the purpose. This measure, however, was vetoed by Governor Robinson.

On July 2, 1862, President Lincoln signed the Morrill Act, "An act donating public lands to the several states and territories which may provide colleges for the benefit of agriculture and the mechanic arts." Section 1 of this act provides—

"That there be granted to the several states, for the purposes herein-after mentioned, an amount of public lands to be apportioned to each state a quantity equal to 30,000 acres for each senator and representative in Congress to which the states are respectively entitled by the apportionment under the census of 1860."

Section 4 requires that the money from the sale of these lands—

"Shall constitute a perpetual fund, the capital of which shall remain forever undiminished, and the interest of which shall be inviolably appropriated by each state which may take and claim the benefit of this act, to the endowment, support and maintenance of at least one college, where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."

Because of the nature of the endowment made by Congress, the institutions founded in accordance with this act are generally known as the "land-grant" colleges. It may well be said

that this was the most far-reaching and statesmanlike stroke of educational policy that any government has ever initiated.

On February 3, 1863, Governor Carney signed a joint resolution passed by the Kansas legislature, in accordance with which the provisions of the Morrill Act "are hereby accepted by the State of Kansas; and the State hereby agrees and obligates itself to comply with all the provisions of said act." On February 16 of the same year the governor signed an act which permanently located the College at Manhattan, and provided—

"That the location of the said college is upon this express condition, that the Bluemont Central College Association . . . shall . . . cede to the State of Kansas, in fee simple, the real estate, . . . together with all buildings and appurtenances thereunto belonging; and shall . . . transfer and deliver to said State the apparatus and library belonging to said Bluemont Central College Association."

The three commissioners appointed by the governor selected 82,313.52 acres of the 90,000 granted by Congress. The deficiency of 7686.48 acres—an amount selected and found to lie within a railroad grant—was not made up by Congress till 1907.

After the passage of the creative act, no subsequent legislation was enacted by the federal government with reference to the "land-grant" colleges until the second Morrill Act, for the further endowment of agricultural colleges, was passed. This bill received the signature of President Harrison on August 30, 1890. This act applied—

"A portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts established under the provision of an act of Congress approved July second, eighteen hundred and sixty-two."

It provided—

"That there shall be and hereby is annually appropriated, out of any money in the treasury not otherwise appropriated, arising from the sales of public lands, to be paid as hereinafter provided, to each state and territory for the more complete endowment and maintenance of colleges for the benefit of agriculture and the mechanic arts now established or which may be hereafter established, in accordance with an act of Congress approved July 2, 1862, the sum of \$15,000 for the year ending June 30, 1890, and an annual increase of the amount of such appropriation thereafter for ten years by an additional sum of \$1000 over the preceding year, and the average amount to be paid thereafter to each state and territory shall be \$25,000, to be applied only to instruction in agriculture, the mechanic arts, the English language, and the various branches of mathematics, physical, natural and economic science, with special reference to the industries of life and to the facilities for such instruction."

The third and last act of Congress increasing the income of agricultural colleges is the Nelson amendment to the agricultural appropriation bill, which was approved March 4, 1907. In addition, however, to providing for an increase in the support of these institutions from federal funds, the law contains

the very significant provision specially authorizing the agricultural colleges to use a portion of this federal appropriation for the special preparation of instructors for teaching agriculture and mechanic arts. The essential features of the Nelson amendment are embodied in the following quotation from the bill:

"That there shall be and hereby is annually appropriated out of any money in the treasury not otherwise appropriated, to be paid as hereinafter provided, to each state and territory for the more complete endowment and maintenance of agricultural colleges now established, or which may hereafter be established, in accordance with the act of Congress approved July 2, 1862, and the act of Congress approved August 30, 1890, the sum of \$5000, in addition to the sums named in the said act, for the fiscal year ending June 30, 1908, and an annual increase of the amount of such appropriation thereafter for four years by an additional sum of \$5000 over the preceding year, and the annual sum to be paid thereafter to each state and territory shall be \$50,000, to be applied only for the purposes of the agricultural colleges as defined and limited in the act of Congress approved July 2, 1862, and the act of Congress approved August 30, 1890; provided, that said colleges may use a portion of this money for providing courses for the special preparation of instructors for teaching the elements of agriculture and the mechanic arts."

The Development of the Kansas Agricultural College

The President and Faculty of the Bluemont Central College became the first board of instruction of the Kansas State Agricultural College, when the former institution was transferred to the State and assumed its present name. The Bluemont Central College was a small institution of the older American classical type, the curriculum resting upon Greek, Latin, and mathematics as the chief fundamentals. Its transfer to the State, and its conversion into the State Agricultural College, involved at the time merely a change in name. The President and Faculty, and the curriculum, remained unchanged. The second catalogue, that of 1864-'65, mentions an "agricultural" course, comprising one preparatory and two collegiate years; but, although this course was strengthened from time to time, the classical studies nevertheless remained until the year 1873, when the character of the institution was radically changed. Intensely practical courses replaced the then existing ones. The new scheme of instruction involved the abolition of the classical course, and the introduction of a practical scheme of industrial education, which comprised a farmer's course of six years, a mechanic's course covering four years, and a woman's course requiring six years. Strong opposition to the new educational policies was encountered, but the authorities of the institution adhered to them unswervingly, until the complete success of the new method silenced criticism. Thus the institution became in fact what it had hitherto been only in name—an agricultural college. In 1879 the Faculty consisted of the President, five professors, and six instructors of lesser rank,

with a student body of 207. During this period of development the College was removed from the original Bluemont College site to its present campus, two miles nearer Manhattan.

From 1879 to 1897 no radical changes were made in the courses of study, but the work was systematized and strengthened in many directions, retaining, however, the distinctive stamp of a college related to the industries. In 1897 the student enrollment was 734—an increase of over 250 per cent during the period of eighteen years. The Faculty had grown in numbers, and the activities of the institution along investigative lines had been well begun through the organization of the Agricultural Experiment Station. In the spring of 1897, owing to certain political changes in the State, and to the appointment of a new Board of Regents that sought radical changes along certain directions, the College entered upon what seemed at the time a rather serious and critical stage. Under the new management greater stress was laid upon the study of financial, economic, and social problems. Several men of considerable note were added to the Faculty for the purpose of strengthening these phases of educational work. In 1897, four professional courses, each four years in length, were organized—in agriculture, in mechanical engineering, in domestic science, and in general science. These years, therefore, mark the beginning of an era of broadening and diversification of the lines of instruction.

In 1899, political changes set aside the then existing administration. During the ten undisturbed years that followed, however, the institution experienced an era of solid, substantial, and uninterrupted growth, gaining steadily in recognition and in influence over the State.

In 1912-'13, the number of heads of departments and full professors was thirty-seven, while the entire Board of Instruction and employees numbered 210. The student enrollment for the year 1912-'13 was 2928. During the decade 1899-1909, additional buildings to the value of about \$250,000 were erected on the campus.

The history of the Kansas State Agricultural College may well be divided into five epochs. The first ten years, from 1863 to 1873, may be called the classical period of the College. The succeeding period, from 1873 to 1879, was the formative stage, the years of the foundation of the Agricultural College properly so called, and bore the stamp of a spirit of pure industrialism of the most intensely "practical" type—an era of ultraradical revulsion from the literary-classical type of instruction which had been supplanted.

The next eighteen years, from 1879 to 1898, may be called the scientific culture period—a period in which, under modified ideals, the institution was sought to be used not so much as a tool to teach young men and women how to make a living as to

teach them *how to live*, and strove to accomplish the end of character building by means of scientific and technical training having especial reference to agriculture.

The following period of two years, brief and to a considerable extent marked by revolutionary changes, may well be united with the succeeding decade, and may be designated in general as the period of expansion and diversification. Expansion of courses, with consequent increased flexibility, plasticity, and adaptability of the means of instruction to the various ends of industrial life, marked this epoch of twelve years. In this period we see a rising tendency toward an increased acknowledgment of the Agricultural College as the guardian and custodian of the State's industrial interests, and a steady growth of settled confidence over the State in its ability to solve the State's industrial problems.

The present time, therefore, finds the College and its inseparable coadjutor, the Experiment Station, occupying a position of far-reaching power and influence in connection with the most vital interests of the State of Kansas.

The Agricultural College accomplishes the objects of its endowment in several ways. It offers a substantial training in mathematics, in the fundamental sciences, in language, in history and civics, and in such other branches of human knowledge as experience has shown to be best adapted to give mental discipline, to develop good citizenship, and to furnish a proper equipment for entering upon active life. The combination of industrial training with the usual class and laboratory work has a special educational value. By the training of the hands the student is made more efficient in every way, is brought into contact with practical things, and is educated toward, rather than away from, an interest in industry and manual exertion. The general training which the College offers aims, therefore, at an equally efficient development of the physical and the mental powers. The greatest immediate aid to improvement in social well-being and to betterment of the conditions of life is a thorough knowledge of science as applied to daily existence. In chemistry and physics, in geology, in botany, in bacteriology, in entomology, in mechanics, the student is brought to an understanding of the relation of man to the world around him, and to a knowledge of how to utilize natural forces for the protection and improvement of his own life.

The College trains directly toward the productive occupations in a considerable number of specialized branches. For example: In agriculture, the student may specialize in agronomy, horticulture, forestry, animal husbandry, dairying, poultry husbandry, or veterinary science. In engineering, the student may take work in mechanical, electrical, or civil engineering; architecture; or printing. For the young women, training

in domestic science, domestic art, home furnishing, home decoration, etc., is offered.

A second large object of the College, made effective through the Agricultural Experiment Station, is to investigate the problems of agriculture in the widest sense. By conducting the researches of the Experiment Station in close connection with the educational work of the College, opportunity is afforded students to gain an understanding and an appreciation of the work of scientific investigation, and to become better able to appreciate the relation of science to agriculture. Opportunity is thus also offered to obtain such training as will fit competent students to become investigators, and to enter fields of agricultural leadership in the experiment stations, in the United States Department of Agriculture, as heads of private agricultural enterprises, or in the capacity of superintendents and managers of such undertakings.

In addition to the regular educational work, the College now maintains, through the Division of College Extension, a highly organized system of agricultural education among the farmers themselves. A corps of trained and efficient institute lecturers hold meetings in every county in the State, conduct seed trains, dairy trains, corn trains, alfalfa trains, and poultry trains, and publish two series of pamphlets of information and instruction—one for rural teachers, the other for members of farmers' institutes. In addition to the regular staff of the Division of College Extension, many members of the College Board of Instruction, and of the staff of the Experiment Station, give several weeks of each year to the public work of the farmers' institutes.

Finally, the College and the Station together are being increasingly charged by the State government with State industrial and police duties, such as pure food investigations, control of feeding stuffs and fertilizers, State forestry work, and other similar duties.

The Experiment Stations

The Agricultural Experiment Station

The Kansas Agricultural Experiment Station was organized under the provisions of an act of Congress, approved March 2, 1887, which is commonly known as the "Hatch Act," and is officially designed as—

"An act to establish agricultural experiment stations in connection with the colleges established in the several states under the provisions of an act approved July 2, 1862, and the acts supplementary thereto."

The wide scope and far-reaching purposes of this act are best comprehended by an extract from the body of the measure itself, in which the objects of its enactment are stated as being—

"To aid in acquiring and diffusing among the people of the United States useful and practical information on subjects connected with agriculture, and to promote scientific investigation and experiment respecting the principles and practice of agricultural science."

The law specifies in detail—

"That it shall be the object and duty of said experiment stations to conduct original researches or verify experiments on the physiology of plants and animals; the diseases to which they are severally subject, with remedies for the same; the chemical composition of useful plants at their different stages of growth; the comparative advantages of rotative cropping as pursued under a varying series of crops; the capacity of new plants or trees for acclimation; the analysis of soils and waters; the chemical composition of manures, natural or artificial, with experiments designed to test their comparative effects on crops of different kinds; the adaptation and value of grasses for forage plants; the composition and digestibility of the different kinds of food for domestic animals; the scientific and economic questions involved in the production of butter and cheese; and such other researches or experiments bearing directly on the agricultural industry of the United States as may in each case be deemed advisable."

On the day after the Hatch Act had received the signature of the President, the legislature of Kansas, being then in session, passed a resolution, dated March 3, 1887, accepting the conditions of the measure, and vesting the responsibility for carrying out its provisions in the Board of Regents of the Kansas State Agricultural College.

Until 1908 the expenses of the Experiment Station were provided for entirely by the federal government. The original creative act (the Hatch Act) carried an annual congressional appropriation of \$15,000. No further addition to this amount was made until the passage of the Adams Act, which was ap-

proved by the President March 16, 1906. This measure provided, "for the more complete endowment and maintenance of agricultural experiment stations," a sum beginning with \$5000, and increasing each year by \$2000 over the preceding year for five years, after which time the annual appropriation was to be \$15,000—

"To be applied to paying the necessary expenses of conducting original researches or experiments bearing directly on the agricultural industry of the United States, having due regard to the varying conditions and needs of the respective states or territories."

It is further provided that—

"No portion of said moneys exceeding five per centum of each annual appropriation shall be applied, directly or indirectly, under any pretense whatever, to the purchase, erection, preservation or repair of any building or buildings, or to the purchase or rental of land."

The Adams Act, providing as it does for original investigations, supplied the greatest need of the Experiment Station—the means of providing men and equipment for advanced research. Only such experiments may be entered upon, under the provisions of this act, as have first been passed upon and approved by the Office of Experiment Stations of the United States Department of Agriculture.

In addition to these, there are now in progress, under the Hatch Act and by means of the State fund, a total of over fifty lines of investigation and experiment, covering all phases of agricultural investigation.

The farms, live stock, laboratories, and general equipment of the College are all directly available for the use of the Experiment Station.

In 1913 the legislature of Kansas appropriated the sum of \$25,000 a year for the next biennium, for the further support of the Experiment Station. The income of the Experiment Station for the year 1913-'14 is therefore derived as follows:

Hatch fund (federal)	\$15,000
Adams fund (federal)	15,000
State appropriation (general)	25,000
State appropriation (special) :	
Coöoperative seed experiments	7,500
Irrigation investigations	2,000
Total	\$64,500

The work of the Experiment Station is published in the form of bulletins, which record the results of investigations along agricultural lines. These bulletins are of three sorts: technical bulletins, which record the results of researches of a purely scientific character, provided for under the Adams Act; farm bulletins which present the data of the technical bulletins in a simplified form, suitable for the general reader; farm bulletins in which a brief, condensed and popular presentation is

made of data which call for immediate application, and can not await publication in the regular bulletin series.

In addition to the bulletins, which report original investigations, the Station also publishes a series of circulars for the purpose of conveying needed or useful information, not necessarily new or original. To date the publications of the Station number 182 bulletins and twenty-seven circulars.

All bulletins and other publications from the Experiment Station are sent without charge to citizens of the State. Any person in the State who so desires may have his name placed on the permanent mailing list of the Station.

Letters of inquiry and general correspondence should be addressed: "Agricultural Experiment Station, Manhattan, Kan." Special inquiries should be directed, so far as possible, to the heads of departments having in charge the matters concerning which information is desired.

PUBLIC WORK OF THE STATION.

In addition to the work of agricultural investigation and research, the State has enlarged the activities of the Station along various lines of state executive or control work.

One of the most important of these adjunct offices is that of State Dairy Commissioner, for which an appropriation of \$7500 a year was made for 1913 and 1914. This official, appointed by the Board of Administration, and having his office at the seat of the Agricultural College, is required (Laws of 1909, ch. 237)—

"To inspect or cause to be inspected all the creameries, public dairies, butter, cheese and ice-cream factories, or any place where milk or cream or their products are handled or stored within the State, at least once a year, or oftener if possible."

He may in connection with the Board of Administration of the College—

"Formulate and prescribe such reasonable rules and regulations for the operation of creameries, butter, cheese and ice-cream factories and public dairies as shall be deemed necessary by such board to fully carry out the provisions of this act."

He may act on complaints regarding the sale of unwholesome or unclean dairy products, and may prohibit their sale. He may—

"Condemn for food purposes all unclean or unwholesome milk, cream, butter, cheese or ice-cream, wherever he may find them."

Another important State function is that of the State Entomological Commission. (Laws of 1907, ch. 386; 1909, ch. 27.) This commission, created in 1907, was established—

"To suppress and eradicate San José scale and other dangerous insect pests and plant diseases throughout the State of Kansas."

The professors of entomology at the Agricultural College and at the State University are by law designated as two of the five members of the above commission. Acting under the title of State entomologists, they divide between them the territory of the State, for purposes of inspection.

They are empowered—

“To enter upon any public premises . . . or upon any land of any firm, corporation or private individual within the State of Kansas, for the purpose of inspection, destroying, treating or experiment upon the insects or diseases aforesaid.”

They may treat or cause to be treated “any and all suspicious trees, vines, shrubs, plants, and grains,” or, under certain conditions, may destroy them. They must annually inspect all nursery stock, and no nursery stock is to be admitted within the State without such inspection. For the expenses of the work of the commission, \$5000 was appropriated in 1913 for each of the following two years.

Concerned with the live-stock interests of the State is the State Live Stock Registry Board, with regard to which there is the following provision (Laws of 1913) :

“Every person, persons, firm, corporation, company or association that shall stand, travel, advertise or offer for public service in any manner any stallion in the State of Kansas, shall secure a license certificate for such stallion from the Kansas State Live Stock Registry Board, as herein provided. Said board shall consist of the dean of the Division of Agriculture, head of the Animal Husbandry Department, and the head of the Veterinary Department of the Kansas State Agricultural College.”

To this board is assigned the duty of licensing stallions used for breeding purposes within the State, and authority to verify their breeding and to classify them under the following heads: pure-bred, grade, cross-bred, and scrub. No animal not thus approved and licensed with the board is permitted to be used for public breeding purposes.

The suppression of tuberculosis in cattle is also delegated by the State to the Agricultural College. (Laws of 1909, ch. 160.)

Another provision for encouraging the improvement of live stock is embodied in an act of the legislature (Laws of 1909, ch. 46)—

“Providing for experimental and demonstration work with live stock at the Kansas State Agricultural College.”

For this purpose there was appropriated the sum of \$7500—

“Which shall be known as a revolving fund, to be used in providing experimental and demonstration work with live stock at the Kansas State Agricultural College, at Manhattan, Kan., under the direction and approval of the Board of Regents of said institution; which said fund shall be used only for the purpose of purchasing live stock and feed, and such other expenses as may be necessary for caring for said stock and conducting demonstrations and experiments therewith.”

Stock thus acquired can be sold by the Board of Administration, when in the judgment of the Board it seems advisable, and the receipts from such sales are to be turned over to the State treasurer's office, there to constitute a "revolving fund," to be drawn upon for new purchases of live stock.

By legislative act (Laws of 1909, ch. 49), a "division of forestry" at the Agricultural College is also provided for in the following terms:

"For the promotion of forestry in Kansas there shall be established at the Kansas State Agricultural College, under the direction of the Board of Regents, a division of forestry. The Board of Regents of the Kansas State Agricultural College shall appoint a State forester, who shall have general supervision of all experimental and demonstration work in forestry conducted by the Experiment Station. He shall promote practical forestry in every possible way, compile and disseminate information relative to forestry, and publish the results of such work through bulletins, press notices, and in such other ways as may be most practicable to reach the public, and by lecturing before farmers' institutes, associations, and other organizations interested in forestry."

For carrying into effect the provisions of this act, there was appropriated for the fiscal years 1912 and 1913, \$2000 each.

The State has also placed the Experiment Station in charge of the execution of the acts concerning the manufacture and sale of live-stock remedies and commercial feeding-stuffs (Laws of 1913), and also of commercial fertilizers (Laws of 1907, chapter 217). It is provided by the statutes that—

"Every brand of live-stock remedy and every brand of commercial feeding-stuff offered or held for sale or sold within the State of Kansas shall be registered in the office of the Director of the Agricultural Experiment Station of the Kansas State Agricultural College, and each sale of any such brand not so registered shall constitute a separate violation of this act."

And—

"Except as herein provided, it shall be unlawful within the State of Kansas to sell, offer for sale, or expose for sale any commercial fertilizer which has not been officially registered by the Director of the Agricultural Experiment Station of the Kansas State Agricultural College."

These general provisions are limited in their application by important exceptions stated in the laws. The fees collected under these acts are used to defray the necessary expenses incurred in carrying out the provisions of the act.

It will thus be seen that the State of Kansas is making increasing use of the scientific staff of the Experiment Station in matters of state importance requiring the application of technical knowledge.

A late and important addition to the Experiment Station is the recently established Department of Milling Industry. The great economic importance of the wheat and milling interests of this State, and the difficult nature of the problems connected with the milling and baking quality of wheat, render it im-

perative that scientific research be conducted on the subject. The hearty coöperation and financial support of all the millers' associations and of other commercial bodies rendered it financially possible to inaugurate this important experimental work until special legislative appropriation could be secured. The legislature of 1913 appropriated \$7500 for mill equipment, and there is now being installed the best equipped experimental milling plant in the United States.

The research work includes a complete study of the growing, harvesting, storing and marketing practices and their relation to the milling value of wheat; of systems of grading, and their effect upon the market value of grain; of insect enemies of wheat in the field and in storage; and of flour and mill by-products. There will also be conducted a comprehensive study of the effects of climate and soil upon the chemical composition of wheat, and upon its subsequent milling and baking quality. A specially equipped laboratory for carrying on experimental baking tests, and for making certain chemical determinations, has been installed. This will aid very materially in carrying on the research work.

By the act of the legislature (Laws of 1911, ch. 23, p. 46) the Regents of the Agricultural College are authorized—

"To investigate the present methods used in growing and distributing agricultural seeds in the State; to determine by experiments the methods of growing seed best adapted to different localities; to encourage farmers in the use of the best methods of seed production; to determine by investigation those localities most in need of improved seed, and to aid such localities in securing desirable seed."

For carrying out the provisions of this act, the sum of \$7500 is appropriated for each of the two years 1912 and 1913.

Experiments and demonstrations on the proper use of irrigation waters, in coöperation with the irrigation investigations of the United States Department of Agriculture, are authorized by act of the legislature (Laws of 1911, ch. 214, p. 378). For this purpose there was appropriated the sum of \$2000 annually for the years 1911-'12 and 1912-'13.

Branch Agricultural Experiment Stations**Fort Hays Branch Station**

The land occupied by this Station is a part of what was originally the Fort Hays military reservation. Being no longer required for military purposes, it was turned over to the Department of the Interior October 22, 1899, for disposal under the act of Congress of July 5, 1884. Before final disposition of this land was made, however, the Kansas legislature, in February, 1895, passed a resolution requesting the Congress of the United States to donate the entire reservation of 7200 acres to the State of Kansas for the purposes of agricultural education and research, for the training of teachers, and for the establishment of a public park. Bills giving effect to this request were introduced into Congress without avail, until the fifty-sixth Congress, when, through the influence of Senator, later Regent, W. A. Harris, and of Congressman Reeder, a bill was passed, setting aside this reservation "for the purposes of establishing an experimental station of the Kansas Agricultural College and a western branch of the Kansas State Normal School thereon and a public park." This bill was approved by the President on March 28, 1900. By act of the State legislature, approved on February 7, 1901, the act of Congress donating this land and imposing the burden of the support of these institutions was accepted. The same session of the legislature passed an act providing for the organization of a branch experiment station and appropriating a small fund for preliminary work.

The land at the Fort Hays Branch Station consists mainly of high rolling prairie, with a limited area of rich alluvium bordering on a creek, and is situated on the edge of the semi-arid plain region. It is well suited for experimental and demonstration work in dry farming, in irrigation, and in crop, forestry, and orchard tests, under conditions of limited rainfall and high evaporation.

The work of this Station is confined to the study of the problems peculiar to the western half of the State, and relates especially to crop production under limited rainfall, to the origination of varieties better adapted to the climatic conditions there prevailing, and to studies of the systems of animal husbandry suited to this region. A systematic study of the value of trees as preventives of soil drifting is being made on a scale sufficiently large to bring definite conclusions. The facilities of this Station are being used for the growing of large quantities of pure seed of the strains and varieties which have proved in actual test to be most productive in the western part of the State.

This Station is supported entirely by State funds and by the sale of farm products. Under the terms of the acts of Congress establishing and supporting agricultural experiment stations, and under the rulings of the United States Department of Agriculture, none of the funds appropriated by the federal government may be used for the support of branch experiment stations.

The State appropriation for the maintenance of the Fort Hays Branch Experiment Station is \$25,000 for 1914 and \$30,000 for 1915.

Garden City Branch Station

In 1906 the county commissioners of Finney county purchased, for purposes of agricultural experimentation, a tract of land amounting to 320 acres, situated four and one-half miles from Garden City, on the unirrigated upland.

This land has been leased for a term of ninety-nine years to the Kansas Agricultural Experiment Station as an "experimental and demonstration farm," for the purpose of determining the methods of culture, crop varieties, and crop rotations best suited to the southwestern portion of the State, under dry-land farming conditions. A pumping plant irrigating from eighty to one hundred acres has been installed for the purpose of investigating the expense of pumping and the cost of equipment necessary for plants of this type which are common in the shallow-water district between Garden City and Scott City and along the Arkansas valley. The "duty of water" and the methods of applying water are objects of investigation. For improvements and maintenance of this Station the sum of \$5500 a year was appropriated for 1914 and 1915.

Other Branch Stations

Branch stations are maintained at Dodge City and Tribune, and at these stations experimental and demonstration work is conducted for the benefit of the districts surrounding these points. Cropping systems, summer-fallow methods, time of planting, variety testing, and breeding of special crops are the principal work undertaken. At Dodge City a dairy herd is maintained.

The legislature of 1913 appropriated for the maintenance of the Dodge City Station \$4500 for the year 1913-'14, and \$4500 for the year 1914-'15, and for the Tribune Station \$3000 for 1913-'14, and \$3000 for 1914-'15. The legislature of 1913 also appropriated \$6000 for the establishment of a Branch Station in Kearny county, with \$2000 maintenance for 1913-'14, and \$2000 for 1914-'15. It also appropriated \$11,000 for the establishment of a Branch Station in Thomas county, with \$2000 additional for maintenance for 1913-'14, and \$2000 for 1914-'15.

Engineering Experiment Station

The Engineering Experiment Station was established by the Board of Regents for the purpose of carrying on a continued series of tests of engineering and manufacturing value to the State of Kansas, on a scale sufficiently large for the results to be of direct commercial value.

For the past four years tests of cement and concrete have been conducted, using principally Kansas-made cements and such materials for the aggregate in the concrete as can be found in different localities in the State. In connection with this series of tests, a study is being made of the waterproofing and coloring of cement building blocks.

Tests of Kansas coals are now in progress. The coals are being tested by hand firing, and by firing by means of three different types of mechanical stokers. The coals being tested include mine-run, slack, nut, screened, lump, and washed-pea coals. The purpose is not only to determine the relative values of the different coals for steam generation, but more particularly to ascertain the best methods of firing the coals of each locality, and the relative values of the different kinds of coal obtained from any single mine. These tests are conducted with both natural and induced draft, the Station owning an induced-draft equipment and economizer.

The Station owns a 100-horsepower gas producer using bituminous coal. So far, the gas from this producer has been used only for laboratory and cooking purposes, and the tests that have been carried on have been for the purpose of determining the relative values of the various coals as regards (1) cost per cubic foot of gas; (2) adaptability with respect to mechanical manipulation in the producer; (3) freedom from sulphur and disagreeable gases; (4) the production of tar and other by-products.

The tests will be extended to include an investigation of the possibilities of lighting with gas. Subsequently, by means of internal-combustion engines, the efficiency of such an installation for power production, the purpose for which the producer was designed, will be determined by experiment.

The producer testing equipment includes calorimeters for the analysis of solid, liquid, and gaseous fuels, a Venturi tube for the measurement of gas, a thermo-electric pyrometer, and such other apparatus as is essential for the carrying out of complete tests. Each test is conducted for a period of several weeks, in order to eliminate errors in the estimation of the coal and "stand-by" losses.

As there are but very few other plants in the country satisfactorily using bituminous coal for producer gas, it is believed that the experiments now being carried on will give valuable results.

For some time, in coöperation with the Office of Public Roads of the United States Department of Agriculture, the College has been carrying on traction tests to determine the effective width of tire on different road surfaces. The equipment for this purpose includes a recording traction dynamometer designed by the College and built by the Office of Public Roads. The first two series of these tests are ready for publication, and will be issued by the Office of Public Roads. It is the intention to conduct further experiments of this nature for an indefinite period.

Two years ago there was completed a series of pipe-covering tests, the purpose of which was to determine the relative values of different pipe coverings for high- and low-pressure steam, both as compared with one another and as compared with bare pipe. These tests are made when the pipe is first covered, and are repeated after the covering has been subjected to hard usage.

Other experiments now in progress are concerned with: (1) lubricants and bearings; (2) power required for driving machine tools; (3) loss of power in transmission by shaft, bearings, chains, and gears; (4) the relative adaptability, efficiency, and cost of gasoline, kerosene, and denatured alcohol for internal-combustion engines; (5) the cost of compressing air and the efficiency of compressed air for power purposes; (6) endurance of paints. As applied to roofs, the paint tests have been in progress for five years, and they will be extended to include other cases of exposure to weather. The investigation is directed especially to the relation of the chemical nature of the pigments and of the oils employed in painting to the durability of the paints.

Among the projected investigations are: (1) underground water flow in various parts of the State, and methods of developing it for irrigation; (2) the possibilities of developing water-power for small plants to be used on farms and in isolated communities for driving machinery, either directly or by electric transmission, and for lighting, this investigation to include the preparation and publication of plans for these plants; (3) the continuation of investigations as to the strength of structural details in timber, metal, and reinforced concrete; (4) studies of the tractive effect or efficiency of draught of horses; (5) tests of small gasoline-electric units; (6) methods of cooling condensed steam; (7) tests of Kansas brick and other road material.

As soon as a series of tests is completed, the results are published in bulletin form, and may be had on application to the director. Besides the results of investigations, compilations of engineering data and important principles are made from various sources and are published in bulletins for the assistance of engineers, mechanics, and others in their respective lines of work.

Grounds, Buildings, and Equipment

The college campus occupies a commanding and attractive site upon an elevation adjoining the western limits of the city of Manhattan, with electric car service into town and to the railway stations. The grounds are tastefully laid out according to the designs of a landscape architect, and are extensively planted with a great variety of beautiful and interesting trees, arranged in picturesque groups, masses, and border plantings, varied by banks of shrubbery and interspersed with extensive lawns, gardens, and experimental fields. Broad, well-shaded macadamized avenues lead to all parts of the grounds. Cement walks connect all of the buildings with one another and with the entrances. Including the campus of 160 acres, the College owns 748 acres of land at Manhattan, valued at \$185,000, and rents 390 acres in addition. Outside the campus proper, all of the land is devoted to educational and experimental work in agriculture. Within the college grounds, most of the space not occupied by buildings and needed for drives and ornamental planting is devoted to orchards, forest and fruit nurseries, vineyards, and gardens. A number of fields in the northern and western portions of the campus are used for general experimental work by various departments.

The college buildings, twenty-one in number, are harmoniously grouped, and are uniformly constructed of limestone obtained from the college quarries. A central power plant furnishes steam heat and electric light and power to the buildings, and a plant for the manufacture of producer gas supplies some of the laboratories and shops. The College owns and operates its own system of waterworks and is provided with a complete sewerage system.

AGRICULTURAL HALL (NEW). Cost of portions now completed, \$125,000; cost of building when developed and completed as planned, \$500,000. The completed building will consist of a central portion (130 x 80 feet), with basement and three stories; of two wings (each 80 x 169 feet), with basement and three stories, and with a sub-basement under half of the east wing; and of a stock-judging pavilion placed back of the central portion and between the wings. This pavilion is now completed, and contains tie and box stalls and two large stock-judging rooms (45 x 100 feet), each having a seating capacity of 475. Each of these rooms may be divided into two, with a passage between, by the use of curtains. The east wing of the building is used by the Departments of Agronomy, Animal Husbandry, Milling Industry, and Poultry Husbandry.

This wing contains, besides offices and recitation rooms of these departments and the general offices of the Agricultural Experiment Station, a complete small flour mill, and laboratories for grain judging. Value of equipment and apparatus: Agronomy, \$6,460; Animal Husbandry, \$535.50; Experiment Station, \$3,040; Milling Industry, \$849; Poultry Husbandry, \$88.

AGRICULTURAL HALL (OLD). Erected, 1900; cost, \$25,000; dimensions, 90 x 95 feet; two stories and basement. Occupies the original site of the president's house, destroyed by lightning in 1896. Contains laboratories, classrooms, and offices.

ANDERSON HALL. Erected, 1879; cost, \$79,000; dimensions, 152 x 250 feet; two stories and basement. Contains the offices of administration of the College, a lecture hall, the college post office, offices of the Division of College Extension, and offices and classrooms of the Departments of Architecture and Drawing, Economics, English Language, English Literature, and Mathematics. Value of equipment and apparatus, \$11,777.

AUDITORIUM. Erected, 1904; cost, \$40,000; dimensions, 113 x 125 feet. Seating capacity, 3,000. Contains also the offices and music rooms of the Department of Music. Value of equipment, Department of Music, \$3,392.

CHEMISTRY ANNEX. Erected, 1877; cost, \$8,000; dimensions, 35 x 110 and 46 x 175 feet, in the form of a cross. Originally erected as a chemical laboratory; occupied by the Department of Chemistry until 1900, when a fire destroyed the interior. The building was reconstructed in 1902, at a cost of \$5,000, for use as a women's gymnasium. Since the fall of 1911 the building has been used by the Department of Chemistry. Value of apparatus and equipment, about \$4,000.

DAIRY BARN. Erected, 1900; cost, \$4,000; dimensions, 40 x 175 feet. Fitted with modern swinging stalls for eighty head of cows, and arranged in two rows with driveway between. Value of equipment, Department of Dairy Husbandry, \$1,400.

DAIRY HALL. Erected, 1904; cost, \$15,000; dimensions, 72 x 103 feet; one story and basement. Contains butter-manufacturing rooms, hand-separator room, laboratory, class room, three offices, and two refrigerating rooms. Occupied entirely by the Department of Dairy Husbandry. Value of equipment and apparatus, \$7,075.

DENISON HALL. Erected, 1902; cost, \$70,000; dimensions, 96 x 166 feet; two stories and basement. The east wing is occupied throughout by the laboratories, class rooms, and offices of the Department of Chemistry. The west wing is occupied by the Department of Electrical Engineering and by the Department of Physics. Value of equipment and apparatus: Chemistry, \$34,135; Electrical Engineering, \$17,084; Physics, \$8,554.

DOMESTIC SCIENCE AND ART HALL. Erected, 1908; cost, \$70,000; dimensions, 92 x 175 feet; two stories and basement. The first floor and basement are occupied by the laboratories, class rooms, and offices of the Department of Domestic Science; the second floor is occupied by the laboratories, class rooms, and offices of the Department of Domestic Art. Value of equipment and apparatus: Domestic Science, \$10,328; Domestic Art, \$3,207.

ENGINEERING SHOPS. These consist of several connected structures, erected at different times. The original building, now used as the woodworking shop, was erected in 1876; a series of additions having later been successively made, the present group is the result. The cost of the whole amounts to \$35,000. The woodworking shop (40 x 103 feet; two stories high) has on the upper floor the offices and drafting rooms of the Departments of Civil Engineering, Steam and Gas Engineering, and Shop Methods and Practice, and contains on the lower floor benches for 220 students, these benches being completely equipped with woodworking machinery and tools. Adjoining is the machine shop (40 x 50 feet), supplied with benches and the usual bench tools, and amply equipped with machine tools. The blacksmith shop (40 x 50 feet) contains forty forges of modern type, connected with a power blast and down-draft exhaust. Adjoining is a lecture hall, with demonstration forge and equipment. An iron foundry (40 x 50 feet), a brass foundry (16 x 30 feet), a pipe-fitting and work room (55 x 40 feet), and a boiler room (40 x 75 feet) complete the series of shops. Value of equipment and apparatus, \$35,019.

FAIRCHILD HALL. Erected, 1894; cost, \$67,750; dimensions, 100 x 140 feet; two stories, basement, and attic. On the first floor are the college library and reading rooms, a newspaper reading room, offices of the librarian and his assistants, and the general museum. On the second floor are the offices, class rooms and laboratories of the Departments of Zoölogy, Entomology, and Geology, and of History and Civics. The museums of natural history are placed here also. The basement is occupied largely by recitation rooms and offices of the Department of History and Civics. Value of equipment and apparatus: Entomology, Geology, and Zoölogy, \$22,714; History and Civics, \$472; Library, \$93,518.

FARM BARN. Erected, 1878-1886; cost, \$10,831; a double, connected stone structure, dimensions, 50 x 75 feet and 48 x 96 feet, with an addition of sheds and experiment pens 40 x 50 feet. The south wing, 48 x 96 feet, is the feed and storage room. A basement underlies the entire building. Value of equipment, Department of Animal Husbandry, \$500.

FARM MECHANICS HALL. Erected, 1870; cost, \$11,250; dimensions, 46 x 95 feet; two stories. The first building erected

on the present campus. Originally designed as a college barn, and first used for that purpose. Later used as a general college building, then by the Department of Botany, and afterwards by the Department of Veterinary Medicine. The first floor, a large hall, was used by the Department of Military Science for many years, as an armory. The entire building has been given over for the use of the Department of Farm Mechanics, and is filled with all types of farm machinery. Value of equipment, \$7,000.

HORTICULTURAL BARN. Erected, 1880; cost, \$1,000. Contains storeroom, granary, and stable room for several horses.

HORTICULTURAL HALL. Erected, 1907; cost, \$50,000; dimensions, 72 x 116 feet. This building, one of the best and most commodious on the campus, is now used by the Departments of Botany, Horticulture and Forestry. Its class rooms, laboratories, museums, and equipment are modern and ample. Value of equipment: Botany, \$25,450; Forestry, \$438; Horticulture, \$4,730.

HORTICULTURAL HALL (OLD). Erected, 1877; cost, \$4,000; dimensions, 32 x 80 feet; one story and basement.

HORTICULTURAL LABORATORY. Erected, 1888; cost, \$5,000; dimensions, 30 x 30 feet; one story and basement. Used for many years by the Department of Horticulture and Entomology, then for horticultural work when that was made a separate department. Contains offices occupied by the State Dairy Commissioner. Five propagating houses are connected with it. Value of equipment, \$843.

KEDZIE HALL. Erected, 1897; cost, \$16,000; dimensions, 70 x 84 feet; two stories and basement. The first floor and basement are occupied by the Department of Printing and by offices of the Department of the English Language; the second floor is divided into general class rooms and offices used by the Departments of Industrial Journalism and the English Language. Originally constructed for the use of the Departments of Domestic Science and Domestic Art, the building has been used for present purposes since 1908. Value of equipment and apparatus: English Language, \$193; Industrial Journalism, \$498; Printing, \$7,990.

MECHANICAL ENGINEERING HALL. Erected, 1909; cost, \$80,000; dimensions, 113 x 200 feet; three stories in height, but much of it built on the gallery plan rather than by complete floor separation into different stories. This building contains the general offices of the Division of Engineering, the offices and drafting rooms of the Departments of Civil Engineering and Architecture, an engineering reference library and reading room, an amphitheater for lectures and demonstrations, and the experimental laboratories for applied mechanics, hydraulics, thermodynamics, transmission, and gas

and oil engines. The engines, turbines, generators and boilers that furnish power and light for the College are installed in this building. Adjoining is the frame structure containing the gas producers, which are used for supplying gas to the domestic science and veterinary buildings, and which are also used in connection with the experimental work of the laboratories. Value of equipment and apparatus, \$77,087.

NICHOLS GYMNASIUM. Erected, 1911; cost, \$122,000; dimensions, 102 x 221 feet; three stories and basement. The building consists of a main section and two wings. The main section (85 x 141 feet), consisting of two stories and a basement, is used as a men's gymnasium and armory, and contains a running track, sixteen laps to the mile. The east half of the basement of the main section contains a swimming pool, baths, rest room, etc., for women; the west half contains a swimming pool and baths for men. The east wing (40 x 102 feet) contains the women's gymnasium, class rooms and offices of the Departments of Military Training, Public Speaking, and Philosophy, and several literary society halls. The west wing (40 x 102 feet) contains the offices of the Director of Physical Training, a large locker room for men, class rooms and offices of the Department of German, and several literary society halls. This building, which is modern in every respect, is constructed on the old armory-castle type and is a magnificent piece of architecture. Value of apparatus and equipment, \$4,290.

VETERINARY HALL. Erected, 1908; cost, \$70,000; dimensions, 133 x 155 feet; two stories and basement. Occupied by the laboratories, demonstration and dissecting rooms, class rooms and offices of the Departments of Veterinary Medicine and Bacteriology. Value of equipment and apparatus: Veterinary Medicine, \$14,952; Bacteriology, \$6,357.

Library

The general College Library consists of all books belonging to the College, including the library of the Experiment Station, which is incorporated with it. On March 20, 1913, the Library contained 41,133 bound volumes, besides much unbound material. It receives currently about four hundred serial publications. As a depository the Library receives the documents and other publications of the United States government. The books are classified according to the Dewey system and are indexed in a dictionary card catalogue.

All students, as well as all officers of administration and instruction, have the privilege of direct access to the book stacks. The Library is primarily for free reference use, but the privilege of drawing books is accorded to all those connected with the College as registered students or as members of the Fac-

ulty. Books not specially reserved may be drawn for home use for two weeks. All books are subject to recall at any time.

General reference books, books reserved for classes, general periodicals, and certain other groups of books are to be consulted only in the reading rooms. They may not be loaned from the Library except when the reading rooms are closed. They must then be returned to the Library by the time it next reopens. Any violation of the regulations of the Library subjects the offender to a fine, or to a withdrawal of Library privileges, or to both, according to the gravity of the offense. More serious offenses, such as mutilation or theft of books or periodicals, are considered just causes for suspension or expulsion of the offender, who is also required to make good the loss incurred.

Reading Rooms.—Three reading rooms are maintained in connection with the Library: the general reference room, containing encyclopedias, dictionaries, atlases, bibliographies, and general reference books; the special reference room, containing books reserved for classes; and the newspaper room, containing the important daily and weekly Kansas newspapers. These rooms are freely open to the students and to the public for purposes of reading and study.

Divisional Libraries.—Divisional and departmental collections are deposited in certain College buildings apart from the main Library. These collections are for the special convenience of the instructors and students of the departments concerned. They are under the direction of the Librarian and are accessible to all students at regular hours.

Hours of Opening.—The Library is open daily, except on legal holidays, from 7:30 o'clock A. M. to 5:30 o'clock P. M. during the regular College year. During vacation periods it is open daily from 8 o'clock A. M. to 5 o'clock P. M.

Requirements for Admission

The entrance requirements to the College are made broad and flexible, only fundamental subjects being definitely required. These requirements are made upon the supposition that high schools are local institutions in which the courses should be adapted to the needs of the individual localities, and that college entrance requirements should be such as to take the output of the high schools, rather than to determine the nature of the work offered in them.

Persons, to be admitted to any department of the College, must be at least fourteen years of age. Fifteen units of high-school work are required for admission to the freshman class. A unit is defined to be the work done in an accredited high school or academy in five recitation periods a week for one school year. Students will be admitted to the freshman class who offer thirteen or more units of acceptable high-school work, but will be conditioned in enough subjects to bring the total to fifteen units. Such conditions must be made up by the opening of the following College year; if not made up by that time, College work is to be taken in their place.

The following table shows the subjects that will be accepted for admission, the number of units of each that are required, and the number that will be accepted provided the fixed requirements are met:

	<i>Required</i>	<i>Accepted</i>
ENGLISH	3	4
FOREIGN LANGUAGE	None	1 to 4
MATHEMATICS	2 or 3*	4
Algebra .....	.....	1½
Geometry .....	.....	½ or 1½*
Trigonometry .....	.....	None
NATURAL SCIENCE	1	4
Physics .....	.....	1
Chemistry .....	.....	None
Physiography .....	.....	None
Astronomy .....	.....	None
“Biology” .....	.....	None
Botany .....	.....	None
Zoölogy .....	.....	None
Physiology .....	.....	None

Not less than one unit of any one language will be accepted. One to four units may be offered from one or more of the following: Latin, Greek, German, French, Spanish.

	<i>Required</i>		<i>Accepted</i>
SOCIAL SCIENCE	1	.....	4
Greek and Roman History		None	1
Medieval and Modern History		None	1
English History		None	1
American History		None	1
Civil Government		None	$\frac{1}{2}$
Economics		None	$\frac{1}{2}$ or 1
Sociology		None	$\frac{1}{2}$ or 1
VOCATIONAL SUBJECTS	None	.....	4
Agriculture		None	1 to 4
Woodwork		None	$\frac{1}{2}$ or 1
Ironwork		None	$\frac{1}{2}$ or 1
Drawing		None	$\frac{1}{2}$ or 1
Domestic Art		None	$\frac{1}{2}$ to 2
Domestic Science		None	$\frac{1}{2}$ to 2
Bookkeeping		None	$\frac{1}{2}$ or 1
Stenography		None	$\frac{1}{2}$ or 1
Typewriting		None	$\frac{1}{2}$ or 1
Commercial Law		None	$\frac{1}{2}$
Commercial Geography		None	$\frac{1}{2}$
Psychology		None	$\frac{1}{2}$
Methods and Management		None	$\frac{1}{2}$
Music		None	1
Arithmetic, if taken after one year of Algebra		None	$\frac{1}{2}$

* One and one-half units of geometry, in addition to one and one-half units of algebra, are required for admission to a course in engineering, to the course in architecture, or to the course in general science.

DEFICIENCIES

The courses in the School of Agriculture offered in connection with the College give every needed opportunity for students of the College to make up anything lacking in their preparation for entrance. All such entrance deficiencies must be made up before the beginning of the sophomore year. No student is registered in the senior class unless all deficiencies of the preceding years have been provided for. Candidates for graduation must make up all deficient subjects before the beginning of the spring term of the senior year. No student is considered a candidate for graduation the next June who is deficient more than three full subjects in addition to his regular assignment at the beginning of the fall term. No student who fails or is conditioned or found deficient in any subject, or whose grade in more than one subject falls below G in any term, is allowed to carry extra work during the succeeding term.

ADVANCED CREDIT

At the discretion of the President, students who present certificates showing credits for college work done in other institutions are allowed hour-for-hour credit on courses in this College in so far as they may be directly applied, or can be

accepted as substitutions or electives. In cases in which it is impossible for one to furnish an acceptable certificate concerning work upon which advanced credit is asked, examinations are given, if the subject has been studied under competent instruction.

ADMISSION

ADMISSION BY EXAMINATION. Examinations for admission will be held at the College on Tuesday, September 16, 1913; Monday, January 5, 1914, for the winter term; and Monday, March 30, 1914, for the spring term.

ADMISSION BY CERTIFICATE. The applicant is required to submit to the committee on admission by diploma a certificate of the high-school or academy credit properly certified to by the authorities of the institution in which the work was done. Blanks will be furnished by the College for this purpose. It is requested that all work done in such high school or academy be presented upon these blanks, in order to expedite the granting of credit to such applicants as are entitled to it.

SPECIAL STUDENTS

In recognition of the fact that experience and maturity tend to compensate, in a measure at least, for lack of scholastic attainments, the College admits as special students those who are twenty-one years of age or older, without requiring them to pass the regular examinations, provided (1) they show good reason for not taking a regular course; (2) they be assigned only to such work as they are qualified to carry successfully; (3) they do superior work in the subjects assigned.

A special student is assigned by the dean of the division in which occur the major subjects to be pursued.

Requirements for Graduation

For graduation, one must complete one of the four-year courses as shown elsewhere. These are believed to provide for the necessities of most students who seek an institution of this kind, and departures from the specified work are not encouraged. Under special conditions, however, such College substitutions are allowed as the interests of the student demand. The total requirement, including military drill or physical training, is about 220 term hours, or credits, the credit unit being one hour of recitation or lecture work, or two hours of laboratory work, a week, for one term of twelve weeks. As the allowance for laboratory work is liberal, and much of this is included in all courses, the total requirement named is not regarded as excessive.

DEGREES

The degree of bachelor of science (B. S.) is conferred upon those completing the four-year course in agriculture, mechanical engineering, electrical engineering, civil engineering, architecture, industrial journalism, home economics, or general science.

The degree of doctor of veterinary medicine (D. V. M.) is conferred upon those completing the four-year course in veterinary medicine.

The degree of bachelor of agriculture is conferred upon students who have completed the freshman and sophomore work of the four-year course in agriculture, who have been conspicuously successful in farming for a period of five years under the supervision of the Faculty of the College, and who have furnished the Faculty, through the Dean of the Division of Agriculture, acceptable reports of their work and progress.

CERTIFICATES

A certificate in agriculture is granted students completing the first two years of the four-year course in agriculture.*

A certificate is granted to those completing either of the two-year short courses in agriculture.

A certificate is granted to those completing the six-month housekeeper's course.

* Under certain conditions and restrictions, students of mature years who can not spend four years in college, and who may be applicants for the degree of bachelor of agriculture or for the certificate in agriculture, may, on the completion of all of the work required in the freshman year, have the privilege of selecting such courses in advance of the sophomore year, under the advice and with the approval of the Dean of the Division of Agriculture, as may be especially adapted to their needs; but in no case can courses based on prerequisites not yet completed be undertaken.

ADVANCED DEGREES

The degree of master of science is conferred upon graduates of this College and of other institutions after all the requirements incident to the bestowal of the degree have been complied with.

For graduates of this institution up to, and including, the class of 1916, the work for the degree of master of science consists of ninety-six credit units. The work of applicants who are graduates of other institutions is evaluated by a committee consisting of the chairman of the committee on advanced credit and of the dean of the division and the head of the department in which the major is to be taken, and the student is given proper standing.

Forty-eight of the required ninety-six credit units are designated as supplementary minors, and are to be derived from studies that are intended to strengthen the student's general preparation; the remaining forty-eight are taken from studies of a special nature. Of the forty-eight credit units derived from special training, thirty-two are given to the major subject and sixteen to the minors. The nature and distribution of the major and minors are determined in each individual case by a committee, consisting of the dean of the division and the head of the department in which the major is taken.

Credit units due an honor student are applied on supplementary minors. In case a student nearing graduation has time, he may be permitted, by arrangement with the dean of the division and the head of the department in which he expects to do the major work, to spend his extra time on studies which will count toward the degree of master of science.

A thesis consisting of a clear statement of the investigation of some worthy original problem is required. The candidate is subjected to a rigid oral examination, covering both the general and special fields of his preparation, including his thesis, by a committee consisting of the dean of the division, the heads of the departments in which his major and regular minors have been taken, and the chairman of the standing committee on graduate study.

The full responsibility for the successful conduct of the graduate work is lodged in a representative standing committee of the Faculty, consisting of five members selected by the President, and this committee has the right to pass on all courses offered, on all assignments taken out, and on the standing of all graduate students.

General Information

DUTIES AND PRIVILEGES

Good conduct in general, such as becomes men and women everywhere, is expected of all students. Every possible aid and stimulus toward the development of sound and rational character, and toward the formation of high standards of personal honor and ideals of conduct, is given by the various Christian organizations of the College and the town. Every student is accordingly expected to render a good account of himself in the College community life. For those who are high-minded and reasonable, no other requirements need be expected. On the other hand, the demands of the College life leave no room for the idle or self-indulgent, for those who are too reckless to accept reasonable or wholesome restraint, or for those who are too careless or indifferent to take proper advantage of their opportunities. The College discipline is confined chiefly to sending away those whose conduct, after fair trial, makes their further attendance at the College unprofitable or inadvisable.

Absences from class or laboratory periods must be accounted for to the instructor concerned. Permission for absence from College for one or more days must be secured in advance from the dean of the division in which the student is registered. Students can not honorably leave the College before the close of a term except by previous arrangement with the deans concerned.

Opportunities for general scientific, literary, and forensic training are afforded, in addition to the College courses, by various literary and scientific societies and clubs. The Science Club, meeting semi-monthly, admits to membership all instructors and students interested in science. The College branch of the American Institute of Electrical Engineers, the Agricultural Association, and the Architectural Club admit to their membership young men interested in the fields indicated by their names. Of the strictly literary and debating clubs, the Alpha Beta and the Franklin are open to both sexes; the Ionian, the Eurodelphian, and the Browning are women's societies; the Webster, the Hamilton, and the Athenian admit only young men to membership.

At various times during the year, the College halls are opened for social, literary, musical, and dramatic entertainments furnished by lecture courses, by the literary societies, by the Department of Music, by the Dramatic Club, by the

Oratorical Association, and by other organizations of students and instructors. Addresses by prominent speakers, men of affairs, and persons prominent in scientific, educational, and social work are of frequent occurrence.

EXPENSES

Tuition is free. An incidental fee of three dollars a term is charged all students resident in Kansas. For nonresidents, a matriculation, or entrance, fee of ten dollars, and an incidental fee of ten dollars a term, are charged. A medical fee of fifty cents a term is also collected from each student, in return for which he receives medical treatment in case of sickness. Receipts for these fees must be presented before enrollment in the College classes. No other fees are charged. In all laboratories students are required to pay for apparatus and supplies broken or lost. The student is at no expense for musical instruction, or for the College diploma. Rooms and board are not furnished by the College. Table board in private families and at boarding houses varies from \$3.25 to \$4.50 a week, the average being about \$3.75. Rooms are obtainable at from \$5 to \$10 a month when occupied by one person, \$8 to \$12 when occupied by two. The highest-priced accommodations include light, heat, and bath.

The College Young Men's Christian Association offers accommodations in its building to a limited number of students, at prices from \$10 to \$13 a month for rooms with modern conveniences, and \$3.25 a week for table board. As the number of rooms in the building is limited, applications should be made to the secretary of the association a year in advance. Board can usually be obtained at any time.

Some students board themselves at less cost than the prices charged for table board, and unfurnished rooms may sometimes be obtained very cheaply. Washing costs from 50 to 75 cents a dozen pieces. Books cost on the average about \$5 a term.

Each young man who takes military drill is required to have a military uniform, costing about \$15, and each young woman who takes physical training must have a physical-training suit, costing about \$4. Ordinary expenditures, aside from clothing and traveling expenses, range from \$175 to \$300 a year.

SELF-SUPPORT

The courses of instruction are based upon the supposition that the student is here for study, and therefore a proper grasp of the subjects can not be obtained by the average student unless the greater part of his time is given to College work. Students of limited means are encouraged and aided in every possible way, but unless exceptionally strong, both mentally and physically, such students are advised to take lighter work

by extending their courses, in case they are obliged to give any considerable time to self-support. As a rule, a student should be prepared with means for at least a term, as some time is required in which to make acquaintances and to learn where suitable work may be obtained.

There are various lines in which students may find employment. The College itself employs labor to the extent of about \$1200 per month, at rates varying from 15 to 20 cents an hour, according to the nature of the employment and the experience of the employee. Most of this labor is upon the College farm, in the orchards and gardens, in the shops and the printing-office, for the janitor, etc. Various departments utilize student help to a considerable extent during the vacations. Students demonstrating exceptional efficiency, ability, and trustworthiness obtain limited employment in special duties about the College. Many students secure employment in various lines in the town, and some opportunity exists for obtaining board in exchange for work, with families either in town or in the neighboring country. Labor is universally respected in the College community, and the student who remains under the necessity of earning his way will find himself absolutely unhampered by discouraging social conditions. False standards regarding physical work do not exist, and are not tolerated by the board of instruction or by the student body as a whole. Absolutely democratic standards prevail at the College, and students are judged on the basis of their personal worth and efficiency alone.

Students are assisted to obtain employment by means of the employment bureaus maintained by the Young Men's Christian Association and by the Young Women's Christian Association of the College, with secretaries of which organizations correspondence is encouraged. New students are also met at the trains by committees from these two bodies, and are assisted in the finding of rooms, and in various other helpful ways.

BUSINESS DIRECTIONS

General information concerning the College may be obtained from the President or the Secretary. Financial matters are handled through the office of the Financial Secretary.

Scientific and practical questions, and requests for special advice along lines in which the College and the Experiment Stations are prepared to give information, should be addressed to the heads of the departments concerned with the work in which the information is sought.

Applications for farmers' institutes should be made as early in the season as possible to the Division of College Extension. Applications for the publications of the Agricultural Experiment Station should be addressed to: Director of the Agricultural Experiment Station.

Donations to the Library should be addressed to the Librarian, and donations to the Museum to the Curator of the Museum.

STUDENT ASSEMBLY

The Student Assembly is held from ten until ten-thirty o'clock on four mornings of each week. At this time, offices, class rooms, and laboratories are closed and the students gather *en masse* in the College Auditorium. These assembly exercises consist of devotional services, music, and addresses. The devotional exercises are conducted by members of the Faculty, by resident ministers of the various denominations, or by prominent visitors. Excellent music is provided by the College Orchestra, by members of the Department of Music, and by available outside talent. In addition to the short, pointed addresses delivered by the President and by members of the Faculty, many prominent leaders of state and national reputation are invited to address the assembly. Thus the Student Assembly has become a center of true culture and enlightenment. Although attendance is not compulsory, it is common to see nearly two thousand enthusiastic students present during these exercises.

COLLEGE PUBLICATIONS

The official organ of the College is *The Kansas Industrialist*, published weekly by the Department of Industrial Journalism, and printed at the College by the Department of Printing. Its pages are filled with articles of interest, with special reference to agriculture and the industries. Particular attention is paid to information concerning the work of the College, to investigations of the Experiment Stations, and to local and alumni news. *The Kansas Industrialist* will be sent to any citizen of the State for fifty cents a year, and to any non-resident for seventy-five cents a year. The alumni may have *The Kansas Industrialist* free upon application.

The Department of College Extension issues a monthly publication entitled *Agricultural Education*, of special interest to institute members. The students of the College publish a semi-weekly periodical, *The Kansas Aggie*, formerly "The Students' Herald," in the interest of the students at large. This paper is edited and managed by a staff elected by students. A College annual, *Royal Purple*, is published each year by the senior class.

EXAMINATIONS

Examinations are held at the last regular recitation periods of the respective studies at the end of each term. Whether the examination is to extend over the last two periods or over one only is left to the decision of the individual instructor. Examinations to remove conditions are held on the next to the

last Saturday of each term. A student who has received the grade C is entitled to take such special examination, provided the instructor be notified of the student's desire to take the examination not later than the Tuesday evening preceding the Saturday set for the examinations. A grade of P, only, is to be reported for a student who passes the examination to remove a condition. A grade of F is to be reported for one who fails to pass. If a subject in which a student is conditioned is not passed at the first opportunity, the grade is changed from C to F. The instructor will report as incomplete (I) any student whose work, while satisfactory in quality, is lacking in the quantity required. The grade I in such cases is removed when the student completes the required quantity of work in a satisfactory manner. With the consent of the head of the department, incomplete work may be made up outside of class, but if it is not made up by the last Saturday of the first term during which the student is in attendance following the term in which the deficiency occurred, the student's grade is changed from I to F, and he is required to make up the work by repeating it in a regular class. Incomplete work made up is to be reported as P.

Permission for examination in subjects not taken in class must be obtained, on recommendation of the professor in charge, from the dean of the division in which the student is assigned, at least two months before the examination is held. Permission to take such examination is not granted unless the preparation for it is made under an approved tutor. All such examinations are under the immediate supervision of the professor in whose department the subject falls.

GRADES

Students' grades are based upon the completed work of a term, and are designated by letters having the following signification and rank:

E, excellent; G, good; P, passed; C, conditioned; I, incomplete (applied to all work which is satisfactory as to quality, but not as to quantity); F, failed.

Any student who receives a grade of E for the term, in any subject, and who is charged with not to exceed six absences for all causes from the class in such subject during the term, may be excused from the final examination in that subject, at the discretion of the instructor; provided, however, that instructors are to announce such exemption lists in their respective subjects not earlier than the last session of the class preceding the final examinations.

Examinations to remove conditions are reported simply as P (passed) or F (failed), and such examinations not taken, or taken and not passed, are recorded F (failed).

HONORS

In each of the divisions of the College, "junior honors" are awarded at Commencement to not more than five per cent of the junior class having the highest standing for the College year.

In a similar manner "senior honors" are awarded to not exceeding five per cent of the senior class having the highest standing for the College year.

Any student achieving senior honors receives two credit units toward the master's degree; a student achieving both junior and senior honors receives six credit units toward the master's degree.

The following is the system of awarding honor points: The grades received by the student carry plus and minus "points" as follows:

- Grade E (excellent) carries + 2 points.
- Grade G (good) carries + 1 point.
- Grade P (passed) carries 0 point.
- Grade C (conditioned) carries — 1 point.
- Grade F (failed) carries — 2 points.

When grade C (conditioned) is subsequently changed by the examination to remove a condition to grade P (passed) or grade F (failed) the points are changed accordingly.

In the estimation of honor points, the number of points attached to any given grade is multiplied by the number of hours a week required in the subject. In the case of a subject consisting wholly or in part of shop practice or laboratory work, *one-half* the number of hours required in such shop practice or laboratory work is taken in computing the multiplying factor.

The award of honors is to those achieving the highest *algebraic sum* of honor points, according to the foregoing schedule, and under the limitations provided above.

CLASSES

The minimum numbers for which classes are organized are as follows:

School of Agriculture	18
Freshmen or Sophomores	12
Juniors or Seniors	7

This rule is varied only by special permission of the Board of Administration.

School of Agriculture

The School of Agriculture is organized to meet the needs of young men and young women of Kansas who may need instruction more closely identified with the life of the farm, home and shop than that provided by the high schools of the State. It is also intended to meet the needs of those men and women who find themselves for any cause unable to complete an extensive course of collegiate instruction, yet who feel the necessity of a practical training for their activities in life. More than one-half of the student's time in the school will be spent in the laboratories and in contact with the real objects of his future work. An element of culture and general information is provided for in three years of English for each course, and in work in history, economics, citizenship, physics, and chemistry.

The School of Agriculture is not a school preparatory to the College. Its sole purpose is to fit men and women for life in the open country, and to make country life more attractive; to make the workshop more efficient; in short, to dignify and to improve industrial life. It is not established to entice students away from the high school. It is for those of every walk in life who wish a larger view and greater skill in doing the world's work.

All the resources of the College are at the disposal of the School of Agriculture. Its students have every advantage possessed by students in the College.

THE COURSE OF STUDY

The course in agriculture emphasizes the growing of crops and the raising of live stock. A minimum of theory and a maximum of practical work will bring the student into close contact with the actual conditions of farm life.

The course in domestic science emphasizes the care of the home. Home decoration, home sanitation, cookery and sewing receive careful attention.

The course in mechanic arts leads to a trade. It is designed to shorten the time of apprenticeship and to prepare the way for skilled workmanship in shop or factory. The great amount of time spent in the shops should easily lead to skill and efficiency in subsequent work.

ADMISSION

Students who are fourteen years of age or older and who have completed the eighth grade of the public schools are admitted without examination. Students who have not completed the eighth grade are examined in arithmetic, United States history, English grammar, geography, reading, and spelling. Students who have done work in the public high schools receive credit for the work done. Maturity in years and practical experience are given due consideration, but students should not consider these qualifications alone sufficient to admit them. Wherever there is question about a student's qualifications for entering, he should correspond with the Principal of the School of Agriculture before coming.

TIME OF OPENING

All candidates for admission to the School of Agriculture should present themselves for registration at the College September 15 to 18, inclusive. The Principal of the School of Agriculture is charged with the execution of all College and Faculty rules relating to the enrollment of students in classes and their choice of studies.

Upon registration each student receives a certificate of his standing, which he presents to the Principal of the school, who is charged with the duty of enrolling students in classes, selecting and arranging subjects, and assigning hours.

GRADES AND FAILURES

Examinations are held at stated periods and at such other times as the Faculty may provide. Absence from examination, or ten or more unexcused absences from class periods, sever a student's connection with the institution, which connection can be renewed only through the action of the Principal of the school. Any withdrawal from school or class must be authorized by the Principal; otherwise, continued absence is construed as failure. Parents or guardians are furnished a copy of the record of the student's work at the close of any term if they so desire.

Course in Agriculture

(SCHOOL OF AGRICULTURE)

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR

FALL

Industrial Arithmetic A	4 (4-0)
General Biology I	4 (2-4)
Stock Judging I	3 (0-6)
Farm Carpentry	3 (0-6)
English Readings	4 (4-0)
Military Drill or Physical Training	
Music*	

WINTER

Algebra	4 (4-0)
General Biology II	4 (2-4)
Beginning Poultry	3 (2-2)
Farm Blacksmithing	3 (0-6)
Grammar and Composition	4 (4-0)
Military Drill or Physical Training	
Music*	

SPRING

Applied Geometry	4 (4-0)
General Biology III	4 (2-4)
Grain Crops	4 (3-2)
Farm Machinery	3 (1-4)
Elementary Composition I	4 (4-0)
Military Drill or Physical Training	
Music*	

SECOND YEAR

El. Chemistry I	4 (3-2)
English History	4 (4-0)
English Classics I	4 (4-0)
Gardening I	3 (2-2)
Stock Judging II	3 (0-6)
Physical Training	
Music*	

El. Chemistry II	4 (3-2)
American History	4 (4-0)
Elementary Composition II	4 (4-0)
Rural Economics	3 (3-0)
Breeds and Breeding	3 (3-0)
Physical Training	
Music*	

El. Agricultural Chemistry	4 (3-2)
Civics	4 (4-0)
Elementary Rhetoric	4 (4-0)
Farm Insects	3 (3-0)
Horse and Sheep Prod.	3 (3-0)
Physical Training	
Music*	

THIRD YEAR

Forage Crops	3 (2-2)
Theme Writing	4 (4-0)
Physics A-I	4 (3-2)
Diseases of Farm Animals	3 (3-0)
Gas Engines or	3 (-)
Grain Products	3 (2-2)

Farm Management and Farm Accounts	4 (3-2)
Physics A-II	4 (3-2)
Beef and Pork Production	3 (3-0)
Agricultural Bacteriology	4 (3-2)
Handling and Curing Meats	3 (2-2) or
Farm Writing	3 (2-2) or
Farm Buildings	3 (0-6)

Soils and Fertilizers	4 (3-2)
Physics A-III	4 (3-2)
Dairy	3 (2-2)
Conference English	4 (4-0)
Forestry and Ornamental Gardening	3 (2-2) or
Irrigation and Drainage	3 (1-4)

* Elective.

Course in Mechanic Arts

(SCHOOL OF AGRICULTURE.)

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR

FALL	WINTER	SPRING
English Readings 4 (4-0)	Grammar and Composition 4 (4-0)	Elementary Composition I 4 (4-0)
Algebra I 4 (4-0)	Algebra II 4 (4-0)	Algebra III 4 (4-0)
European History I 4 (4-0)	European History II 4 (4-0)	American History 4 (4-0)
Free-hand Drawing 3 (0-6)	Object Drawing 3 (0-6)	Geometrical Drawing 3 (0-6)
Woodwork I 4 (1-6)	Elementary Foundry 4 (1-6)	El. Blacksmithing I 3 (1-4)
Vocational Guidance I 1 (1-0)	Vocational Guidance II 1 (1-0)	Trade Practice* 3 (0-6)
Military Drill or Physical Training	Military Drill or Physical Training	Military Drill or Physical Training

SECOND YEAR

English Classics I 4 (4-0)	Elementary Composition II 4 (4-0)	Elementary Rhetoric 4 (4-0)
Plane Geom. I 4 (4-0)	Plane Geom. II 4 (4-0)	Solid Geom. 4 (4-0)
Physics M-I 4 (3-2)	Physics M-II 4 (3-2)	Physics M-III 4 (3-2)
Shop Drawing I 3 (1-4)	Shop Drawing II 3 (1-4)	Shop Drawing III 3 (1-4)
Trade Practice* 6 (0-12)	Trade Practice* 6 (0-12)	Trade Practice* 6 (0-12)
Physical Training	Physical Training	Physical Training

THIRD YEAR

Industrial History 4 (4-0)	Civics 4 (4-0)	Economics 4 (4-0)
Algebra IV 4 (4-0)	Applied Mathematics 4 (4-0)	Conference English 4 (4-0)
Trade Practice* 12 (0-24)	Trade Practice* 12 (0-24)	Trade Practice* 12 (0-24)

* Trade Practice may be elected in one of the following trades: Blacksmithing, Carpentry, Cement and Concrete Construction, Gas Engines, Steam Engines and Boilers, Traction Engines.

Course in Home Economics

(SCHOOL OF AGRICULTURE.)

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR

FALL	WINTER	SPRING
English Readings 4 (4-0)	Grammar and Composition 4 (4-0)	Elementary Composition I 4 (4-0)
Industrial Arithmetic W 4 (4-0)	Algebra 4 (4-0)	Applied Geometry 4 (4-0)
Physiology and Hygiene 4 (4-0)	Home Sanitation 4 (4-0)	Home Management 4 (4-0)
Color and Design I 3 (0-6)	Color and Design II 3 (0-6)	Home Decoration 4 (0-8)
Sewing I 2 (0-4)	Sewing II 2 (0-4)	Sewing III 2 (0-4)
Physical Training Music*	Physical Training Music*	Physical Training Music*

SECOND YEAR

English Classics I 4 (4-0)	Elementary Composition II 4 (4-0)	Elementary Rhetoric 4 (4-0)
English History 4 (4-0)	American History 4 (4-0)	Civics 4 (4-0)
Physics H-I 4 (3-2)	Physics H-II 4 (3-2)	Physics H-III 4 (3-2)
Household Entomology 2 (2-0)	El. of Poultry Keeping 2 (2-0)	Dairying 2 (0-4)
Cooking I 2 (0-4)	Cooking II 2 (0-4)	Cooking III 2 (0-4)
Sewing IV 2 (0-4)	Shirt-waist Suit 2 (0-4)	Dressmaking 2 (0-4)
Physical Training Music*	Physical Training Music*	Physical Training Music*

THIRD YEAR

Theme Writing 4 (4-0)	Practice Writing 4 (4-0)	English Classics II 4 (4-0)
Elementary Chemistry I 4 (3-2)	Elementary Chemistry II 4 (3-2)	El. Household Chemistry 4 (3-2)
Economics 4 (4-0)	Household Bacteriology 4 (3-2)	Gardening I 3 (2-2)
Cooking IV 2 (0-4)	Cooking V 2 (0-4)	Cooking VI 2 (0-4)
Textiles 2 (2-0)	Costume Design 2 (0-4)	Advanced Dressmaking 2 (0-4)
Art Needlework 2 (0-4)	Millinery 2 (0-4)	Food Production 3 (3-0)
Physical Training* Music*	Physical Training* Music*	Physical Training* Music*

* Elective.

Agricultural Courses

AGRONOMY

1.—GRAIN CROPS. First year, spring term. Class work, three hours; laboratory, two hours. Four credits.

This course consists of a study of grain-crop production. The factors that affect the yield of grain crops are given the greatest consideration. These factors include crop adaptation, methods of planting, methods of cultivating, and methods of harvesting. In order that such study may be of the greatest value, the structure of the plants and methods of improvement are considered. The greatest emphasis is placed upon the economic production of the crops. Eight grain crops are included in the study, being given consideration in accordance with their importance in the State.

2.—FARM MACHINERY. First year, spring term. Class work, one hour; laboratory, four hours. Three credits.

In this course the student is taught in the class room the mechanical principles of the different types of farm machinery, and in the laboratory and the field is taught to adjust and operate the machines properly. Instruction is also given in fence construction, rope splicing, and cement work.

3.—FORAGE CROPS. Third year, fall term. Class work, two hours; laboratory, two hours. Three credits.

This course takes up the culture, adaptation, distribution and uses of crops for pasture, hay, roughage, silage, soiling; cover crops; green manure crops. The use of these crops for the maintenance of soil fertility, together with their importance in systems of cropping and rotation, is given special emphasis. The seed production of grasses, legumes, annuals and forage crops is also studied.

Laboratory.—The laboratory work of this course is planned to give the student training in the identification of seeds and plants studied in the class. A study is made of the quality, mixtures and adulteration of seeds. Prerequisites: Grain Crops; General Biology III.

4.—FARM MANAGEMENT AND FARM ACCOUNTS. Third year, winter term. Class work, three hours; laboratory, two hours. Four credits.

The purpose of this course is to correlate in a definite manner the information relating to farming that the student has accumulated in other agricultural courses. The course involves a study of the selection of farms, plans and arrangement of fields and farm buildings, and the investment and proper distribution of capital in the farming business. The relation of live-stock farming to crop farming, and the most profitable combinations of these, together with their effect upon soil fertility and the upbuilding of the farm, are considered. Farm accounts and records are studied, and special emphasis is given to systems of account keeping that are accurate, simple, and applicable to farm conditions. Prerequisites: Forage Crops; Live Stock III.

5.—SOILS AND FERTILIZERS. Third year, spring term. Class work, three hours; laboratory, two hours. Four credits.

This course involves discussion of depth of plowing for different crops, the conservation of moisture, and the handling of soils to prevent blowing. This course also involves a study of the care and use of barnyard manure, of green manuring crops, and of commercial fertilizers. Prerequisites: Agricultural Chemistry; Forage Crops.

6.—IRRIGATION AND DRAINAGE. Third year, spring term. Class work, one hour; laboratory, four hours. Three credits.

This course offers an opportunity for students who are interested in either irrigation or drainage to become familiar with the fundamental principles underlying both these practices. Practical work is given in the field in the use of the level, in digging drainage ditches, in laying tile, and in studying drainage systems in operation on the College farm and adjoining farms.

LIVE STOCK

1.—STOCK JUDGING I. First year, fall term. Laboratory, six hours. Three credits.

This course consists in score-card practice in judging horses, cattle, sheep and swine, in which the students become familiar with the general points to be observed in judging live stock. Text, Craig's *Live-stock Judging*.

2.—STOCK JUDGING II. Second year, fall term. Laboratory, six hours. Three credits.

This course consists of the study of the breeding and market types of horses, cattle, sheep and swine. Two weeks of this time is given to the study of dairy cattle, presented by the Department of Dairy Husbandry.

3.—BREEDS AND BREEDING. Second year, winter term. Class work, three hours. Three credits.

This course consists of the study of pure-bred horses, cattle, sheep and swine, and the methods practiced by the best breeders. It also embraces the study of the general principles of breeding, such as variation and heredity. Text, Marshall's *Breeding Farm Animals*.

4.—HORSE AND SHEEP PRODUCTION. Second year, spring term. Class work, three hours. Three credits.

This course involves the study of successful methods of growing, developing, feeding, and preparing horses for market; also a study of the production of mutton and wool.

5.—BEEF AND PORK PRODUCTION. Third year, winter term. Class work, three hours. Three credits.

This course consists of a study of successful and economical methods of growing and finishing cattle and hogs for market purposes, as well as the breeding of both market and pure-bred animals.

6.—HANDLING AND CURING MEAT. Optional course, third year, winter term. Class work, one hour; laboratory, four hours. Three credits.

This course consists of a study of methods of slaughtering and dressing animals, cutting up carcasses into wholesale and retail cuts, and curing meat for farm use. Laboratory work is offered in killing small animals.

DAIRYING

1.—DAIRY Cows. Second year, fall term.

This course is given as a part of Stock Judging II. Two weeks is devoted to the judging of dairy cattle.

2.—DAIRY. Third year, spring term. Lectures, two hours; laboratory, two hours. Three credits.

This course includes lectures on milk and its composition, Babcock testing, separation, churning, and feeding the dairy herd.

Laboratory.—The laboratory work comprises the operation of the Babcock test, testing separators, churning, and judging dairy cattle.

3.—DAIRYING. Second year, spring term. Laboratory, four hours. Two credits.

Lectures are given at different times during the course, which includes a study of the composition and the secretion of milk, the Babcock test, the principles of separation, the care of milk and cream, cream ripening, butter making, and fancy cheese making.

Laboratory.—This work includes testing milk and cream by the Babcock test, separating milk, churning, and fancy cheese making.

FORESTRY

1.—FORESTRY AND ORNAMENTAL GARDENING. Lectures, two hours; laboratory, two hours. Three credits. Elective in the spring term of the third year of the course in agriculture.

This course covers the principles and methods involved in tree planting, both for the wood-lot and for decorative purposes. The laboratory work consists in making plans for planting home grounds.

HORTICULTURE

1.—GARDENING I. Lectures, two hours; laboratory, two hours. Three credits. Required in the fall term of the second year of the agricultural course.

This course will consist of a study of the principles and practices involved in the care and cultivation of market and home gardens.

MILLING INDUSTRY

1.—GRAIN PRODUCTS. Third year, fall term. Class work, three hours; laboratory, two hours. Four credits.

In this course are studied methods of harvesting, handling and storing of grain, together with the marketing of surplus grain from the farm. This involves methods of selling, shipping and grading grain; organization of grain inspection departments, with their merits and defects; the principal grain markets, with receipts, shipments, and grain consumed. The by-products resulting from the manufacture of food products from grain will be studied with regard to their feeding value and comparative cost.

POULTRY

1.—BEGINNING POULTRY. First year, winter term. Offered in the course in agriculture. Recitation, two hours; laboratory, two hours. Three credits.

This course takes up a discussion of the various operations that go to make up the art of poultry-keeping.

Laboratory.—The laboratory study will include work in dressing, packing and caponizing.

2.—ELEMENTS OF POULTRY-KEEPING. Second year, winter term. Offered in the course in home economics. Recitation, two hours. Two credits.

This course is a duplicate of Poultry 1, except that no laboratory work is required.

VETERINARY MEDICINE

DISEASES OF FARM ANIMALS. Third year, fall term. Class work, three hours. Three credits.

This course is intended to teach the student the recognition of disease, the principles involved in the preservation of health, and the application

of first aid in disease or accident among farm animals. The various diseases resulting from the use of spoiled foods or the improper or injudicious use of good foods are discussed. The value of food, care and nursing of the sick animal is thoroughly impressed upon the student. The common infectious diseases and the means for their prevention and eradication are also considered. Text, Burkett's *Farmer's Veterinarian*.

General Science Courses

BACTERIOLOGY

1.—AGRICULTURAL BACTERIOLOGY. Third year, winter term. Lectures, three hours; laboratory, two hours. Four credits. Required in the course in agriculture.

An elementary course in the principles of bacteriology is here offered, taking up bacteriological problems from an entirely practical standpoint. The course is offered in order to give the student a reading knowledge of the sources and modes of infection; the relation of bacteriology to dairying and to soils and crop production; general sanitation; fermentations, etc.

Laboratory.—General laboratory manipulations; normal and abnormal fermentations of milk and milk products; quantitative study of bacteria in the soil; a limited study of fermentations, of pathogenic bacteria, of sewage pollution of water, etc., comprise the laboratory work.

2.—HOUSEHOLD BACTERIOLOGY. Third year, winter term. Lectures, three hours; laboratory, two hours. Four credits.

This course includes a general survey of the science of bacteriology as applied to the home. It includes a discussion of microorganisms as related to air, water, foods, general sanitation, fermentations, etc. An attempt is made to present the subject in as simple a manner as possible. The course is offered in the hope of giving the student a general understanding of the fundamentals, and a reading knowledge of the science.

Laboratory.—Various microscopic forms of importance in fermentations; preservation and spoilage of foods; the influence of various preservatives upon microorganisms common in the home; methods of sterilization and of pasteurization; the handling of infectious material, etc., are the subjects taken up in the laboratory work.

BIOLOGY

1.—GENERAL BIOLOGY I. First year, fall term. Class work, two hours; laboratory, four hours. Four credits.

In this course the student enters first upon a study of the differences between living and nonliving matter, and of cells as the units of life. The first few exercises following deal with the properties of the chief important elements that form the environment and determine the existence of all living beings—carbon, oxygen, hydrogen and nitrogen—and with the universal need of water for the life of protoplasm. Next follows a study of the chief forces that determine the existence of life—heat and light rays—and especially the limits of life as determined by the solar heat; why light is necessary, and the effect upon life of electrical waves. Next follows a study of growth in plant and animal life, and of the building up of cells into tissues, organs, and bodies, in plants and animals. To this end, the growth of embryo plants and animals is studied. Sporelings and seedlings of plants and their germination, and the growth of embryo animals—chick, frog, various insects, etc.—form a part of this study. What growth means, the increase of size and weight as a conse-

quence, and the development of form, are considered. It is made clear how growth is possible only at the expense of food. Textbook to be selected.

Laboratory.—The course begins with a study of protoplasm in *Amœba*, in the stamen hairs of *Tradescantia*, and in *Nitella*. The external evidences of life are then considered. Movement, and the responses of various plants and animals to light, moisture and gravity are utilized to illustrate life phenomena.

The structure of cells is studied. The division of cells is demonstrated by means of charts and the projection of slides. The growth of cells and of crystals is studied comparatively, to illustrate the difference between living and nonliving matter. A study follows of the nonliving environment, including the chief properties of oxygen, nitrogen, hydrogen, and carbon dioxide. The effects of heat and light upon protoplasm are then considered, including the effects of different temperatures—freezing, boiling, etc.—upon the spores of molds and ferns, upon growing cultures of algae, molds and bacteria, and upon the pollen grains and seeds of higher plants, together with the effects of extreme temperatures upon highly organized growing plants. The influence of light and of its absence upon cultures of molds and bacteria, and upon green growing plants, is determined, and the course closes with a study of the result of withholding water from animals and plants, and with some study of the characteristics of animals and plants that resist drying.

Laboratory outlines furnished by the department.

2.—GENERAL BIOLOGY II. First year, winter term. Class work, two hours; laboratory, four hours. Four credits.

This course begins with a study of the chief sources of food for living organisms, and with a study of the ways in which the simplest animals and plants feed. Then follows a study of chlorophyll, the role of the green plants, and the dependence of all animal life upon plant life. Special ways of obtaining food by plants and animals are then considered, involving a study of parasitic fungi, the world of bacteria or "germ" life, and their relation to higher animals and plants, and the behavior of dodder and other parasites among the higher plants. Parasitic worms and other animal parasites, and their effect on animal life, illustrate the animal side of parasitism. The meaning of most diseases in animals and plants is considered in the light of parasitism. In this course, also, respiration in animals and plants is studied. A study of the machinery of respiration in plants and animals, the breathing of water plants and water animals, the respiration of animals and plants in their resting stages, as in the pupæ of insects and in the seeds of plants, closes the work of the term. Textbook to be selected.

Laboratory.—The course opens with an elementary laboratory study of the simple tests for starch, sugars, fats, and proteids. The feeding habits of a selected series of animal and plant forms are studied. Experiments are conducted to show the way in which green plants make carbohydrates. The life habits of dodder and other parasitic plants are studied. Among animals some time is given to the study of the life habits of parasitic worms. Finally, the respiration of animals and plants is made the subject of simple laboratory experiments. Laboratory outlines furnished by the department.

3.—GENERAL BIOLOGY III. First year, spring term. Class work, two hours; laboratory, four hours. Four credits.

This course opens with a study of reproduction, and the way in which the simplest animals and plants multiply. One-celled animals and plants, which increase by simple division of the cell, are used in the beginning as illustrations. Reproduction in plants by means of spores is studied in molds and other plants, and in ferns. Reproduction is then considered in the higher animals and plants, in which there is a setting aside of special

cells for reproduction, which are separate from the body cells. Fertilization of the higher plants is taken up at some length. The biology of flowers is considered, together with relation of flowers to insects. Attention is given to close- and cross-fertilization, and their consequences in animals and plants.

The course finally closes with a study of the causes of old age and death in animals and plants, of the limits of life, of how life may be prolonged, and of health and disease. The practical applications of biology to human life are brought out, in such matters as sanitation, prevention of the causes of disease, the meaning of cleanliness, the care of the body, and the deleterious effects of various narcotics and stimulants poisonous to protoplasm and to cell life, such as tobacco, opium, coffee, tea, alcohol. Textbook to be selected.

Laboratory.—The students carry on experiments in growing moulds and other fungi, and ferns from their spores. Flowering plants are pollinated in the greenhouse, and the development of their seeds is followed. Experiments are devised in close- and cross-pollination. Fertilization in eggs of frogs, in fish spawn, and in eggs of a brown alga (rockweed), and the development of the animal larvae is followed. The course closes with an attempt to discover the effects of narcotics, alcohol, etc., on protoplasm by experiments with lower forms of life.

CHEMISTRY

1.—ELEMENTARY CHEMISTRY I. Lectures and recitations, three hours; laboratory, two hours. Four credits. Required in the courses in agriculture and home economics.

The work this term is an elementary study of the general principles of chemistry, using the elements oxygen, hydrogen, nitrogen, chlorine, and carbon, and their most important compounds, as its basis. So far as possible, illustrations are drawn from practical life on the farm and in the home. The laboratory work is designed to give the student some knowledge of the essential features of chemical change, as well as to familiarize him with some of the more important elements and chemical compounds.

2.—ELEMENTARY CHEMISTRY II. Lectures and recitations, three hours; laboratory, two hours. Four credits. Required in the courses in agriculture and home economics.

The work this term is a continuation of that begun in Elementary Chemistry I. Sulphur and phosphorus and to a slight extent other non-metals and their compounds are studied. This work is followed by some study of the most important metals and their compounds. The practical aspects of the subject are emphasized throughout.

3.—ELEMENTARY HOUSEHOLD CHEMISTRY. Lectures and recitations, three hours; laboratory, two hours. Four credits. Required in the course in home economics.

In the work of this term, chemistry is studied in its more direct application to the household. The course includes not only some special applications of inorganic chemistry, but simple organic chemistry, especially in its relation to foods. The laboratory work is an application of chemistry to various household problems touching water, foods, textiles, and utensils.

4.—ELEMENTARY AGRICULTURAL CHEMISTRY. Lectures and recitations, three hours; laboratory, two hours. Four credits. Required in the course in agriculture.

The general principles of chemistry are presented as applicable on the farm in relation to soils, fertilizers, dairy products, feeds, water, etc. The laboratory work is made as practical as possible.

ECONOMICS

1.—ECONOMICS. Third year, fall or spring term. Class work, four hours.

This course is a study of fundamental principles underlying man's wealth-getting and wealth-using activities, and their application to conditions and problems of the industries of to-day. Instruction is based on a text, assigned readings, and reports.

2.—RURAL ECONOMICS. Second year, winter term. Class work, three hours.

This course is an introductory study of economic principles as they apply to the business of farming. Special attention is given to co-operation in its relation to rural credit, production, and exchange. Special emphasis is placed on the details of distribution and marketing of the products of the farm and to the purchase of the supplies of the family. Instruction is based on a text, bulletins, and assigned library readings.

ENGLISH

1.—ENGLISH READINGS. First year, fall term. Class work, four hours. Four hours credit. Required of all students.

In this course a careful study is made of interesting standard literary selections. Class readings, class discussions, written sketches, abstracts, and outlines, and training in the practical use of the dictionary, give the student the opportunity to grow in the power to think clearly and to express himself accurately. This course is enriched by interesting outside readings.

2.—GRAMMAR AND COMPOSITION. First year, winter term. Class work, four hours. Four hours credit. Required of all students. Prerequisite: English Readings.

This course is a review of the essentials of the English language. Short, interesting selections are studied definitely and interpreted clearly. The correct thought-interpretation of ordinary English sentences is taught in connection with the selections read and studied. The aim is to give little theory and much practice in the intelligent use of the language.

3.—ELEMENTARY COMPOSITION I. First year, spring term. Class work, four hours. Four hours credit. Required of all students. Prerequisite: Grammar and Composition.

The work of this term includes: instruction in the elementary principles of composition; advanced drill in the use of the dictionary; the study of words and sentences; special drills in punctuation; exercises in letter writing; drills in abstracting; and the writing of short themes. Special personal help is given the student at consultation hours.

4.—ENGLISH CLASSICS I. Second year, fall term. Class work, four hours. Four hours credit. Required of all students. Prerequisite: Elementary Composition I.

The work of this course is centered in the study of selected literary masterpieces. The careful preparation of outlines, sketches, paraphrases, and abstracts, class readings, general class discussions, and special exercises in interpreting character and life, are essentials of the term's work.

5.—ELEMENTARY COMPOSITION II. Second year, winter term. Class work, four hours. Four hours credit. Required of all students. Prerequisite: English Classics I.

This course is a continuation of Elementary Composition I. The course opens with a brief review of the sentence as the grammatical unit of thought-expression, and continues with a thorough study of the paragraph as the rhetorical unit. Special emphasis is placed upon practical writing on topics of keenest interest to the pupil.

6.—ELEMENTARY RHETORIC. Second year, spring term. Class work, four hours. Four hours credit. Required of all students. Prerequisite: Elementary Composition II.

This course includes a general survey of description, narration, exposition, and argumentation, with special emphasis placed upon clear, interesting, effective oral and written expression. Special exercises in punctuation, short drills in proofreading, drills in outlining, abstracting, oral discussions, and elementary debating, are also emphasized in this course.

7.—THEME WRITING. Third year, fall term. Class work, four hours. Four hours credit. Required of all students. Prerequisite: Elementary Rhetoric.

Special emphasis is placed upon exposition, or clear-cut explanation. Pupils are trained to tell accurately and interestingly how things are done in various fields of human activity. This course is conducted with the idea of assisting the student to acquire the habit of clear, accurate thought-getting and thought-expression in all of his technical work.

8.—PRACTICE WRITING. Third year, winter term. Class work, four hours. Four hours credit. Required of students in the course in home economics. Prerequisite: Theme writing.

This course includes a short review of practical exposition, a thorough study of the principles of narration, and the analysis and writing of narrative paragraphs and short stories. Short stories of the farm and home, stories of country life, and other human-interest stories, are required.

9.—ENGLISH CLASSICS II. Third year, spring term. Class work, four hours. Four hours credit. Required of students in the course in home economics. Prerequisite: Practice Writing.

This course is designed to afford an additional drill and study in the cultural side of literature and language. The student is given a bird's-eye view of the field of literature, with an intensive study of representative classics from Shakespeare, Tennyson, and other authors. This intensive study of representative classics is broadened and enriched by well-selected supplementary reading.

10.—CONFERENCE ENGLISH. Third year, spring term. Class work, four hours. Four hours credit. Required of all students in the courses in agricultural and engineering. Prerequisite: Theme Writing.

This course includes a thorough review of the essentials of English. Special emphasis is placed upon the ability to write and to tell accurately the thought to be conveyed. This course requires of all students daily practice in oral and written English, and includes regular conferences and consultations with students on matters concerning their greatest needs in the use of language. The course is designed with special reference to the needs of students in engineering and in agriculture.

ENTOMOLOGY

1.—FARM INSECTS. Second year, spring term. Class work, three hours. Three credits. Required in the course in agriculture. Prerequisite: General Biology.

This is a study of the elementary anatomy, structure and physiology of insects complete enough to give a clear understanding of the general structure of insects and the underlying facts upon which the scientific application of remedial or preventive measures is based. All of the more important insects of the farm, garden, and orchard are discussed at sufficient length to give a clear idea of their life histories and habits, together with the best means of control. The class work consists of lectures and text.

2.—HOUSEHOLD ENTOMOLOGY. Second year, fall term. Class work, two hours. Two credits. Required in the course in home economics. Prerequisite: General Biology.

This course consists of illustrated lectures and reference reading on the habits, life history and general methods of control of the principal insects injurious to house, garden, lawn, and human health.

HISTORY

1.—EUROPEAN HISTORY I. First year, fall term. Class work, four hours. Four credits. Required in the course in mechanic arts.

This course will be introduced by a few lectures on the ancient world, but will take up the more serious part of the work at the fall of Rome and the very beginnings of modern European nationalities and languages, and will trace the story of European history and institutions to the end of the seventeenth century. Text, Robinson's *Introduction to the Study of Western Europe*, pages 1-587.

2.—EUROPEAN HISTORY II. First year, winter term. Class work, four hours. Four credits. Required in the course in mechanic arts.

This course is a continuation of European History I, and covers the period from the opening of the eighteenth century to the present day. Emphasis is placed on present conditions and current events throughout the world. Text, Robinson and Beard's *Outlines of European History*, Part II.

3.—ENGLISH HISTORY. Second year, fall term. Class work, four hours. Four credits. Required in the course in agriculture and in the course in home economics.

This is a course in the history of England, with some attention to contemporary European history and institutions, and serves as a background for the course in American history. Text, Andrews', Coman and Kendall's, Walker's, or Wrong's.

4.—AMERICAN HISTORY. First year, spring term, or second year, winter term. Class work, four hours. Four credits. Required of all students in the School of Agriculture.

This corresponds to high-school courses in American History. It should be preceded by the course in English History or by the courses in European History I and II. This course will be based on Muzzey's *American History* as the text, but a limited amount of library work will be required.

5.—CIVICS. Second year, spring term, or third year, winter term. Class work, four hours. Four credits. Required of all students in the School of Agriculture.

This is not a course of the old type, usually called civil government, nor a course in constitutional law, but a vigorous course in the actual workings of our present-day governmental and political activities. Text, Guitteau's *Government and Politics in the United States*.

6.—INDUSTRIAL HISTORY. Third year, fall term. Class work, four hours. Four credits. Required in the course in mechanic arts.

This is a new course, devoted to a study of American industrial life; how industries have developed, how they have modified history and government, and how in turn they have been modified by historical development and governmental regulations. This course is based primarily on Bogart's *Economic History of the United States*, Second Edition.

INDUSTRIAL JOURNALISM

FARM WRITING. Winter term. Class work, two hours; laboratory, two hours. Four credits.

One term's work is given in the elementary principles of writing for farm papers, newspapers, or magazines on agriculture, home economics, mechanical engineering and other industries taught in the College.

MATHEMATICS

1.—INDUSTRIAL ARITHMETIC A. First year, fall term. Class work, four hours. Four credits.

The course has two distinct aims: (1) a practical knowledge of the principles of numbers, both integral and fractional; (2) the practical application of these principles to problems of the farm and the shop. A large number of problems arising from actual experience over the whole field of agricultural science will be made the basis of problem work. Farm investments, farm accounts, and farm values will receive special attention.

2.—INDUSTRIAL ARITHMETIC W. Fall term. Class work, four hours. Four credits.

The course follows the lines of Industrial Arithmetic A, except that the points of emphasis are varied to meet the needs of young women.

3.—ALGEBRA. First year, winter term. Class work, four hours. Four credits.

The course includes an introduction to the first principles of algebra; the use and meaning of symbols; simple problems in algebraic reckoning; the solution of the simplest equations of the first and second degrees; careful practice in the evolution of algebraic formulæ; first ideas of graphical analysis and the functional relation. Textbook, Wentworth and Smith's *Vocational Algebra*.

4.—ALGEBRA I. First year, fall term. Class work, four hours. Four credits.

This course includes a study of the four fundamental operations, integral linear equations, and factoring. Text, Hawkes, Luby, and Touton's *First Course in Algebra*.

5.—ALGEBRA II. First year, winter term. Class work, four hours. Four credits.

Equations treated by factoring; fractions; fractional and literal linear equations; simultaneous linear equations; graphical representation, are taken up in this course. Text, Hawkes, Luby, and Touton's *First Course in Algebra*. Prerequisite: Algebra I.

6.—ALGEBRA III. First year, spring term. Class work, four hours. Four credits.

The subjects considered in this course are: involution, evolution, the theory of exponents, radicals, quadratic equations, with applications to practical problems. Text, Hawkes, Luby, and Touton's *First Course in Algebra*. Prerequisite: Algebra II.

7.—ALGEBRA IV. Third year, fall term. Class work, four hours. Four credits.

This course includes a rapid review of complex fractions, the theory of exponents, radicals with special attention to rationalization and radical equations, quadratic forms, the theory of quadratics, simultaneous quadratics with graphical work, ratio and proportion, variation, the progressions, the binomial theorem for positive integral exponents. Text, Rietz and Crathorne's *College Algebra*.

8.—APPLIED GEOMETRY. First year, spring term. Class work, four hours. Four credits.

The course includes simple problems in geometrical construction; illustration, rather than proof, of important geometrical theorems; computation of areas and volumes, with especial emphasis upon the problems arising in buildings and constructions on the farm. The whole will consist of a simple and practical course in mensuration.

9.—PLANE GEOMETRY I. Second year, fall term. Class work, four hours. Four credits.

Books I and II of Wentworth and Smith's *Plane and Solid Geometry* are studied in this course. Prerequisite: Algebra III.

10.—PLANE GEOMETRY II. Second year, winter term. Class work, four hours. Four credits.

This course includes a study of books III, IV, and V of Wentworth and Smith's *Plane and Solid Geometry*. Prerequisite: Plane Geometry I.

11.—SOLID GEOMETRY. Second year, spring term. Class work, four hours. Four credits.

Books VI, VII, and VIII of Wentworth and Smith's *Plane and Solid Geometry* are studied in this course. Prerequisite: Plane Geometry II.

12.—APPLIED MATHEMATICS. Third year, winter term. Class work, four hours. Four credits.

This course embraces such subjects as the use of vernier and micrometer calipers and the slide rule; work and power; levers and beams; specific gravity; the use of squared and logarithmic paper; logarithms and the elements of trigonometry; problems in heat and electricity. Text, Cobb's *Applied Mathematics*.

PHYSICAL EDUCATION

MEN'S DEPARTMENT

1-3.—PHYSICAL TRAINING I, II, AND III.

Six health talks. Elementary free-hand calisthenics; elementary light hand apparatus, including wands, dumb-bells, etc.; elementary heavy apparatus work, and games, are taken up. All work is graded in progressive order for each term. Swimming is taught in the spring term. A physical examination is made of each entering student.

WOMEN'S DEPARTMENT

1-3.—PHYSICAL TRAINING I, II, AND III.

Offered in the first year. This is an introductory course, including corrective exercises, light apparatus work, folk dancing, games, swimming. A physical examination is made of each entering student.

PHYSICAL TRAINING IV, V, AND VI.

Offered in the second year. This course continues courses I, II, and III, taking up fancy steps, Swedish gymnastics, games, and swimming.

4.—PHYSIOLOGY AND HYGIENE.

First year, fall term. Class work, four hours. Four credits.

This course includes study of the anatomical structure and physiological functions of the human body. It includes a careful consideration of such factors in the maintenance of health as fresh air, diet, sleep, bathing, exercise, etc.

PHYSICS

1.—PHYSICS A-I. Third year, fall term. Class work, three hours; laboratory, two hours. Four credits. Required of all students in the course in agriculture.

The fundamental laws of mechanics and sound are presented in this course. The application of these principles to agriculture is especially emphasized. Laboratory work is conducted, based upon principles discussed in class and outlined in such a manner as to give students special drill in exact measurements. Text, Carhart and Chute's *Physics*. Prerequisite: Algebra III.

2.—PHYSICS A-II. Third year, winter term. Class work, three hours; laboratory, two hours. Four credits. Required of all students in the course in agriculture.

This is a continuation of work given in Physics A-I. A study is made of the units used in measuring electrical energy, of the principles involved in current distribution, and of the applications now being made of electricity on the farm. Laboratory work is arranged to give students practice in working with electrical instruments and appliances. Text, Carhart and Chute's *Physics*. Prerequisite: Physics A-I.

3.—PHYSICS A-III. Third year, spring term. Class work, three hours; laboratory, two hours. Four credits. Required of all students in the course in agriculture.

This is a continuation of Physics A-II, and involves a study of light and heat as a form of radiant energy involved in plant growth, weather conditions, and general phenomena. The laboratory work consists of thermometer tests, humidity measurements, calorimetry work, and light measurements. Text, Carhart and Chute's *Physics*. Prerequisite: Physics A-II.

4.—PHYSICS H-I. Second year, fall term. Class work, three hours; laboratory, two hours. Four credits. Required of all students in the course in home economics.

The work given in this course has a direct bearing on the principles of mechanics and sound as they apply to the home. The laboratory work is especially adapted to this phase of the work. Text, Carhart and Chute's *Physics*. Prerequisite: Algebra III.

5.—PHYSICS H-II. Second year, winter term. Class work, three hours; laboratory, two hours. Four credits. Required of all students in the course in home economics.

This course is a continuation of Physics H-I. The fundamental principles and laws of electricity are presented in this course, with special applications of the use of electricity in the home. Laboratory work is based on the study of simple electrical appliances used in the home. Text, Carhart and Chute's *Physics*. Prerequisite: Physics H-I.

6.—PHYSICS H-III. Second year, spring term. Class work, three hours; laboratory, two hours. Four credits. Required of all students in the course in home economics.

This course is a continuation of Physics H-II and includes a study of the principles of heat and light, special work being done in illumination and ventilation of the home. The laboratory work is based on methods of measuring heat, testing thermometers, and testing light sources. Text, Carhart and Chute's *Physics*. Prerequisite: Physics H-II.

7.—PHYSICS M-I. Second year, fall term. Class work, three hours; laboratory, two hours. Four credits. Required of all students in the School of Mechanic Arts.

Mechanics and Sound: This course provides the fundamental laws of mechanics and sound as adapted to work in mechanic arts, and special

emphasis is placed upon a thorough knowledge of the units used and of the laws underlying machine principles. Laboratory work is arranged to give the students an opportunity to use some instruments of the better grade for making measurements and to test some of the physical properties of matter. Text, Carhart and Chute's *Physics*. Prerequisite: Algebra III.

8.—PHYSICS M-II. Second year, winter term. Class work, three hours; laboratory, two hours. Four credits. Required of all students in the School of Mechanic Arts.

Electricity: This course is a continuation of Physics M-I. The methods of producing electromotive force and of transferring, transforming, and measuring electrical energy are presented in this course. Laboratory work gives students an opportunity to use instruments and electrical apparatus in measuring and testing the effects of current. Text, Carhart and Chute's *Physics*. Prerequisite: Physics M-I.

9.—PHYSICS M-III. Second year, spring term. Class work, three hours; laboratory, two hours. Four credits. Required of all students in the School of Mechanic Arts.

Heat and Light: This course is a continuation of Physics M-II. A thorough study is made of heat and light as fundamental in the work of a mechanic, especially with respect to its application in heating, lighting and ventilation. The laboratory work gives students opportunity to use light as an accurate method of measurement, and to test materials with respect to heat conductivity. Text, Carhart and Chute's *Physics*. Prerequisite: Physics M-II.

Mechanic Arts Courses

ARCHITECTURE AND DRAWING

1.—FREE-HAND DRAWING. First year, fall term. Laboratory, six hours. Three credits.

This course includes: exercises in drawing simple figures illustrating the effects of geometrical arrangement, radiation, repetition, symmetry, proportion, harmony, and contrast; exercises in drawing conventional plant ornaments; and free-hand lettering.

2.—OBJECT DRAWING. First year, winter term. Laboratory, six hours. Three credits.

Drawing from geometric solids and simple objects. Shading from the object.

3.—GEOMETRICAL DRAWING. First year, spring term. Laboratory, six hours. Three credits.

Construction of perpendiculars, parallels, angles, polygons, tangent connections, etc. Construction of the ovoid, oval, spiral, and ellipse. The use of the T-square, drawing boards, and India ink. Simple working drawings. Lettering.

4.—SHOP DRAWING I. Second year, fall term. One hour of lectures and recitations and four hours of drafting-room practice a week. Three credits.

A study of the fundamental principles of lettering, and the use of drawing instruments. Orthographic projection in its relation to working drawings. Simple exercises leading up to the study of working drawings in the succeeding terms. Prerequisite: Geometrical Drawing. Geometry I must accompany or precede this course.

5.—**SHOP DRAWING II.** Second year, winter term. One hour of lectures and recitations and four hours of drafting-room practice a week. Three credits.

A continuation of the preceding course, with more difficult exercises. In the latter part of the term, free-hand sketches are made of simple machine parts, and working drawings are made from these sketches. Practice is given in making blue-prints. Prerequisite: Shop Drawing I and Geometry I.

6.—**SHOP DRAWING III.** Second year, spring term. One hour of lectures and recitations and four hours of drafting-room practice a week. Three credits.

Further practice in making working drawings of machine parts. Some attention is given to isometric and cabinet projections and to the development of patterns for sheet-metal work. Prerequisite: Shop Drawing II and Geometry II.

7.—**COLOR AND DESIGN I AND II.** Second year, fall and winter terms, respectively. Laboratory, six hours. Three credits each term.

This course consists of a study, by means of water-color exercises, of color and shade values and their effects in designs, fabrics, dresses, wall paper, and decorations of all kinds.

8.—**FARM BUILDINGS.** Third year, winter term. Laboratory, six hours. Three credits.

Study of arrangement and construction of farm buildings. Drawing of plans, elevations, sections and details of a general purpose barn.

9.—**HOME DECORATION.** Third year, spring term. Laboratory, eight hours. Four credits.

Study of design and color and their application to the home, its furniture, carpets and rugs, wall decorations and pictures.

SHOP WORK

1.—**FARM CARPENTRY.** First year, fall term. Shop work, six hours. Three credits.

This is a course of exercises in joinery that are so graded as to give the student the principles of general carpenter work, and training in the proper use of tools and in the reading of drawings and blue-prints. Some work is given to bring out the principles of framing and building operations, and practice in the use of paints and varnishes as protective coverings for woodwork.

2.—**WOODWORK I.** First year, fall term. Lectures, one hour; shop work, six hours. Four credits.

This course consists of a graded set of problems in joinery, the principles of which are used in the latter portion of the course in the making of a few simple pieces of cabinet work, together with practice in the use of stains, varnishes, rubbing and polishing of the articles made.

3.—**ELEMENTARY FOUNDRY.** First year, winter term. Lectures, one hour; shop work, six hours. Four credits.

This course consists of bench and floor molding with a great variety of patterns, along with which the student gets experience with different kinds of sand and facings; also, open sand work, sweep molds, and instruction in machine molding, core making, setting of cores, gates and risers, and different methods of venting, etc. The lectures consist of practical talks on the materials used in the foundry, the selection of sand, methods of venting, drying and handling of molds, cores, etc., for various classes of work. Also discussions on the handling of the cupola and the

grading and mixing of the irons suitable for different classes of work. Special emphasis in all cases being laid upon the practical side of the work.

4.—**FARM BLACKSMITHING.** First year, winter term. Shop work, six hours. Three credits.

This course consists of exercises in general forging operations, such as drawing, upsetting, welding, binding, twisting, hot and cold punching, and instruction in the use of fuel and fire, and the selection and care of tools. The course is such as will be of practical use to the man on the farm.

5.—**ELEMENTARY BLACKSMITHING I.** First year, spring term. Lecture, one hour; shop work, four hours. Three credits.

This consists of a very practical course in the forging operations, such as drawing, upsetting, welding, bending, twisting, punching, etc., together with instruction in the proper use and care of the fire, tools, etc., and in the handling of metals in the forge.

TRADE PRACTICE

1.—**BLACKSMITHING.** First, second and third years.

The greater portion of the student's time is employed in the blacksmith shop, with some practice in the foundry to give him a better knowledge of the methods of producing iron and steel, with a slight amount of work in the machine shop to show him the uses to which steel and iron forgings are put after leaving the blacksmith's hands. The work in the blacksmith shop consists of forging and welding common iron, mild steel and high-carbon steel. The work ranges from simple exercises, designed to teach methods, up through wagon work, tool making and dressing, chisel, tap, reamer, drill, axe and knife hardening and tempering, to exercises in ornamental iron forging and design. Lectures are given along with the work, so that the time required to grasp the fundamental points is much shortened.

2.—**CARPENTRY.** First, second and third years.

In this course the greater portion of the student's time is employed in the carpenter shop, with enough work in cement and concrete construction to familiarize him with the use of concrete, in building foundation work. The work in the carpenter shop will include systematized exercises in bench work and joinery, in details of house framing and finishing, with some practice in cabinet work. Considerable practice will be given in the operation of woodworking machinery. Instruction will be given on methods of laying out work from scale drawings. Practical talks and lectures on best methods of work and on the principles of wood construction, finishing and coatings will be given at frequent intervals throughout the course. This instruction will also include laying out, erecting, framing and finishing completely a small cottage on a reduced scale from architect's blue-prints.

3.—**CEMENT AND CONCRETE CONSTRUCTION.** Secondary School, first, second, and third years.

This course is designed to give the student an all-around training in the different branches of the work as practiced in the factory and field. The work consists of lectures, recitations, drawing, laboratory, and shop work. The greater part of the first two years is devoted to the laboratory and shop. In the third year more time is spent in large construction details of forms, and bracing for same. Attention is given throughout the course to the use of concrete for decorative purposes as well as strength, thus keeping the idea in the mind of the student that utility is not the only object of his work.

4.—GAS ENGINES. Lectures, recitations, and laboratory work.

This includes a study of gas engines using gasoline, kerosene, crude oil, illuminating gas, and the various power gases. It takes up the construction and the practical management of two- and four-stroke cycle engines for stationary, automobile, and traction purposes; carburetors and mixing valves; various ignition systems, magnetos, spark coils, timers, electric batteries; governing of gas engines; gas-engine troubles and remedies.

Laboratory.—The work in this course includes the operation of two- and four-cycle gas and oil engines, dynamos, motors, and charging storage batteries. Practical work in pipe fitting, wiring, babbittting and adjusting bearings, adjusting carburetors, timing of valves and spark, installing electric ignition devices, lubrication and cooling systems, trouble finding, and power determination.

5.—STEAM ENGINES AND BOILERS. Lectures, recitations and laboratory work.

In this course a study is made of the construction, operation and practical manipulation of various types of steam boilers, steam engines, and of the various auxiliaries of the steam power plant. The subjects taken up at considerable length are boiler details, strength of boilers, care of boilers, boiler inspection, hand and stroke firing, fuels and combustion, feed water heaters and water purification, pumps and injectors; steam-engine details, valve gears of steam engines, valve setting of engines and pumps; lubricators, steam traps and separators; steam and water piping; management of steam power plants.

Laboratory.—This course includes practical work in pipe fitting, firing, valve setting, alignment of engines, babbittting, and adjusting bearings; boiler and engine installation; electric installation, repair of boilers, boiler settings, and stokers. Operations of boilers, pumps, injectors, lubricators, stokers, fans for mechanical draft, economizers, feed water heaters, condensers, dynamos, and motors.

6.—TRACTION ENGINES. Lectures, recitations and laboratory work.

Steam and gas traction engines, as well as other forms of commercial vehicles, are taken up in this course. In the case of the steam traction engine, detailed study is made of the various parts of the steam power plant, of the reversing gears and of the transmission mechanism. In connection with the gas tractors, the various types of gas engines used on tractors are considered in detail, as well as the various auxiliaries for the use of light and heavy petroleum fuels. Much time is given to the actual manipulation of various makes of steam and gas traction engines and trucks.

Home Economics Courses

DOMESTIC ART

1.—SEWING I. Laboratory, four hours. Two credits.

This course includes practice in the fundamental stitches and their application to the following: bags, towels, darning, patching, button-holes, Christmas gifts, at the discretion of the teacher.

2.—SEWING II. Laboratory, four hours. Two credits.

The work includes machine problems, practice in flannel, the making of kimonos and cooking aprons.

3.—SEWING III. Laboratory, four hours. Two credits.

The course comprises pattern drafting and the making of corset covers and drawers.

4.—SEWING IV. Laboratory, four hours. Two credits.

The course comprises the drafting of patterns for undergarments, skirt, and waist, and the making of underskirts and nightgowns.

5.—SHIRT-WAIST SUIT. Laboratory, four hours. Two credits.

Making a shirt waist and a skirt and drafting patterns for them, comprises the course. The materials used for the garments may be cotton or linen.

6.—DRESSMAKING. Laboratory, four hours. Two credits.

This course includes practice in the adaptation of patterns and the making of a simple cloth dress.

7.—TEXTILES. Lecture, two hours. Two credits.

The history and manufacture of textiles, the development of spinning and weaving, the classification and study of fibers, practical tests for adulteration, are taken up in the course.

8.—ART NEEDLEWORK. Laboratory, four hours. Two credits.

The course includes the following: stitches in crochet, knitting, cross-stitch, French embroidery, Roman cut work; their application to undergarments, waists, collars, and household articles.

9.—MILLINERY. Laboratory, four hours. Two credits.

The course includes practical and artistic principles; preparing various materials for trimmings; practice in making bows, rosettes, and other forms of hat decoration; making wire and buckram frames; the use of velvet, silk, and straw; renovating, and the use of old materials.

10.—COSTUME DESIGN. Laboratory, four hours. Two credits.

This course includes the study of design, color harmony, and practice in their direct application to designs for textiles, embroidery, and costumes; and the sketching of costumes in pencil and water color.

11.—ADVANCED DRESSMAKING. Laboratory, four hours. Two credits.

This course presents the use of bought patterns and practice in cutting, fitting and finishing more elaborate dresses than those made up in preceding courses.

DOMESTIC SCIENCE

1-3.—COOKERY I, II, AND III. Second year, fall, winter and spring terms, respectively. Laboratory, four hours. Two credits each term.

Fundamental principles and processes of cooking are taken up. The purpose is to familiarize the student with laboratory methods, to give fundamental knowledge of foods and their preparation, and to develop skill and efficiency in the handling of materials, utensils, stoves, and fuels.

4-6.—COOKERY IV, V, AND VI. Third year, fall, winter and spring terms, respectively. Laboratory, four hours. Two credits each term.

Advanced cooking, including the canning and preserving of fruits and vegetables, and the preparation and serving of meals, are the subjects taken up.

7.—FOOD PRODUCTION. Third year, spring term. Class work, three hours. Three credits.

This course is a study of food materials, their growth, the conditions under which they are matured and marketed, and the problems which relate to their storage and transportation.

8.—HOME SANITATION. First year, winter term. Class work, four hours. Four credits.

A study is made of location, surroundings, heating, lighting, ventilation and water supply of the house in their relation to the health of the family.

9.—HOME MANAGEMENT. First year, winter term. Class work, four hours. Four credits.

A study is made of standards of living, including the care of walls, doors, woodwork, and plumbing.

VOCATIONAL GUIDANCE. Freshman year, fall and winter terms.

The purpose of this course is to give the students some insight into the vocations open to them, in order that they may have a sufficient knowledge for making a wise selection of a vocation. Both the social and economic possibilities of the different vocations will be discussed.

Division of Agriculture

WILLIAM M JARDINE, *Dean.*

The teaching of a rational, practical system of agriculture is fundamental to industrial development in a State whose principal resources are derived from agricultural pursuits. This State has permanent prosperity in direct proportion to the producing capacity of her land. The unit of production is the acre, and the most successful farmer is necessarily the one who can produce, at minimum cost, a maximum quantity of the best quality of agricultural products to the acre.

In order to do this, it is necessary to know something of the soil, the conservation of its fertility and moisture, and its proper cultivation; the kinds of plants to grow and how to improve them; the selection, breeding and feeding of live stock; the maintenance of orchards, gardens, and attractive surroundings; farm buildings, and the equipment of the farm home with modern conveniences; the best methods of marketing the products of the farm; and, in addition to all this, the making of the farm home the center of influence for good citizenship and fellowship in the neighborhood.

A man may get many of these things through practical experience, and thus become an exponent of modern farming, but the cost entailed is usually unnecessarily great. The agricultural college furnishes a means of acquiring a systematic and practical training in agriculture, which fits young men adequately for the farm, at a minimum of time and financial cost.

EQUIPMENT

The facilities for such training in this College are of the best. The College owns 748 acres of land, which is used for instruction and demonstration in the various courses in agriculture and allied branches. The campus, which comprises 160 acres, affords one of the best examples of ornamental tree planting and forestry in the State. Students working daily amid such surroundings can scarcely fail to gain an appreciation of and love for the beautiful. A tract of 320 acres, purchased with an appropriation made by the legislature of 1909, is devoted to the work in agronomy. For horticultural and forestry work, eighty acres are used; for dairy work, about seventy acres; and for animal husbandry purposes, 140 acres. The herds and flocks contain all the important breeds of dairy

and beef cattle, hogs, horses, and sheep, among which are included the world's champion steers of a recent international stock show at Chicago, and many animals that have won championships at local and state fairs in the past five years. With this class of stock available for the work in judging, the student is supplied with types of the best breeds, and becomes familiar with these types by actual handling of the stock.

The College has one of the best-equipped schools of veterinary medicine in the West. It is rated in class "A" by the United States Department of Agriculture, which rating places it among the best in the United States and Canada. In addition to giving the student the best possible technical training in veterinary medicine, the course is designed to give the broad culture necessary for men who are to take their place in society and public affairs. Professional men, such as veterinarians, are placed in a more or less public relation to the community they serve. They must have a broad groundwork in cultural and ethical training, which will win them the confidence and respect of their communities. Success is measured in something more than dollars and cents, and the man whose view of life is no broader than his profession adds but little to the world and its happiness. The training given by the College in veterinary science, as in all its courses in agriculture, seeks to emphasize the value of the man as a man, as much as his value as a specialist in agriculture.

COURSES OF STUDY

The various needs of the student are met by offering in the division of agriculture the following courses:

- A four-year course in agriculture.
- A four-year course in veterinary medicine.
- A three-year secondary course in agriculture.
- A two-year short winter course in agriculture.
- A two-year short winter course in dairying.
- A one-year short winter course in dairy manufactures.
- A short course in testing dairy products.

DEGREES AND CERTIFICATES

The four-year course in agriculture leads to the degree of bachelor of science in agriculture. The four-year course in veterinary medicine leads to the degree of doctor of veterinary medicine. A certificate in agriculture is granted to a student completing the three-year course. A short-course certificate is granted to a student completing either of the two-year short courses in agriculture.

The four-year course in agriculture is designed to meet the needs primarily of the students who expect to return to the farm. However, the student who completes any of the courses

offered will have had sufficient training to enable him to enter some one of the many lines of agricultural industry as a specialist. The demand for men thus trained is constantly increasing, and such positions offer attractive opportunities for men who by nature and training are adapted to the work. The United States Department of Agriculture, the state colleges and departments of agriculture, high schools, private institutions of secondary and college rank, and a great variety of commercial interests, are constantly demanding men trained in agriculture.

The young man who expects to make farming his life work can start with no better asset than the thorough training in practical and scientific agriculture afforded by the four-year course. The American farmer needs more of the skill that comes through the training of the hand, in order that he may better do the work of farming; but infinitely more, he needs the training of the mind in the fundamental truths that lie back of every operation in farming, in order that he may use the skill of the craftsman with reason and judgment. One may learn to plow a field with the greatest skill; the work may be a model of its kind. If, however, it is plowed with utter disregard of the moisture conditions which prevail, the result may be failure. To understand the conditions which should determine when and how to plow is the work of the trained mind; the other is the work of the trained hand. The farmer and the teacher in farming must possess both kinds of training, and the courses of study have been revised with this fact in view, and have been so arranged that *the student begins his practical training in agriculture on the first day he enters College, and continues it throughout the course.*

THE COURSE IN AGRICULTURE

Two hundred fourteen credits in addition to military drill are required for graduation, as follows:

	<i>Credits.</i>
Prescribed agriculture	55
Electives in agriculture required, with their prerequisites	<u>35 to 40</u>
Required in agriculture	90 to 95
Prescribed in nonagriculture	107
Electives in nonagriculture required	<u>17 to 12</u>
Required in nonagriculture	124 to 119
Total term hours for graduation	214 214

Only those students will be allowed to graduate who have had at least six months' practical experience in agriculture, approved by the Dean of the Division of Agriculture, and who have elected (including the prerequisites) 20 credits within a

department of the Division of Agriculture. The prerequisites are to be other than those in the required work.

The student who completes the freshman and sophomore years will have had, in addition to the fundamental work in chemistry, zoölogy, and botany, practical studies each term in farm crops, cattle, hogs, horses, sheep, dairying, poultry, horticulture, and farm mechanics. These two years give the student a general knowledge of the whole range of practical agriculture. One-third of the student's time is devoted to these subjects.

During the junior and senior years the student continues his studies of fundamental science, and learns to apply science to practical agriculture. He is led step by step to understand the scientific relation of every farming operation. There is so much agriculture to be taught that it becomes necessary for the student to choose in which of the general lines he will find that which best suits his needs or liking. This is made possible by numerous electives in soils, crops, farm machinery, animal husbandry, dairying, horticulture, milling, and poultry.

The foundation of all agricultural work is the soil and the crops grown upon it. Success in live stock or dairying depends, in a great measure, upon the ability of the soil to produce, with economy, sufficient crops of the right character. Success in grain farming depends wholly on the productivity of the soil and the selection of the crops and of methods of culture adapted to the region under cultivation.

THE COURSE IN VETERINARY MEDICINE

Veterinary medicine has made remarkable advances within recent years, and is taking its place alongside human medicine as a science. In truth, medical science and veterinary science are but specialized branches of the same science, and must be developed together. The modern veterinarian takes his place in the community as a professional man of education and culture. With the general improvement of the live stock on the farms, and with their advance in value, there is constant increase in the demand for skilled physicians to care for them.

The veterinarian, while primarily trained to conserve the health of farm animals, has a yet larger service to render in preventing diseases common to both man and beast from being communicated from domestic animals to man. Moreover, he must see that the animals slaughtered for meat are healthy and that the products are handled under such conditions as render them suitable for human food.

The public is now demanding that milk and other food products be free from contamination, and that they be incapable of transmitting dangerous diseases, like tuberculosis, typhoid fever, scarlet fever, and diphtheria. There is ample

work for all of the thoroughly competent veterinarians that the colleges of the country will train.

The course in veterinary medicine at the Agricultural College was established to give the young men of this State an opportunity to pursue these studies in an agricultural environment, where the facilities offered by other branches of the College would be at their command. While the instruction in this course is largely technical, enough subjects of a general character are included to give a sound education and a broad outlook.

Better to fit the veterinarian to deal wisely with the live-stock problems which he has to meet, he is required to take the work in stock feeding, stock breeding, stock judging, pedigrees, milk inspection, vertebrate zoölogy, embryology, and agricultural economics, in addition to his purely professional work.

The diploma from this school is recognized by the United States Department of Agriculture, by the United States Civil Service Commission, by the American Veterinary Medical Association, and by the various examining boards of the several states and territories of America where it has been presented.

THREE-YEAR COURSE IN AGRICULTURE

The purpose of the three-year course is to furnish practical, systematic training in agriculture to persons of mature judgment who are unable to meet the college entrance requirements. The work is given by the regular members of the College Faculty. This course, throughout, emphasizes the practical phases of agriculture. The necessity for a thorough understanding of the fundamental principles that form the foundation upon which agricultural practices are built, is, however, not lost sight of, and as much of this phase of the work is given as the student's preparation will permit.

Course in Agriculture

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
English I 4 (4-0)	English II 4 (4-0)	College Rhetoric I 4 (4-0)
General Botany 5 (3-4)	Plant Anatomy 5 (3-4)	Plant Physiology I 4 (2-4)
Market Types and Classes of Stock 4 (1-6)	Breeding Types and Classes of Stock 4 (1-6)	Plant Propagation 4 (3-2)
Military Drill	Military Drill	Dairy Judging 2 (0-4)
		Military Drill

SOPHOMORE

Qualitative Analysis 4 (2-4)	Elementary Organic Chemistry 4 (4-0)	Quantitative Analysis I 2 (2-0), or
Cereal Crop Production 5 (3-4)	Forage Crops 4 (3-2)	Agricultural Chemistry 2 (2-0)
General Zoölogy I 4 (2-4)	General Zoölogy II 4 (2-4)	Farm Mechanics 4 (2-4)
Anatomy 5 (0-10)	Library Methods 2 (1-2)	Embryology 4 (2-4)
	Animal Physiology 4 (4-0)	Principles of Feeding 4 (4-0)
Military Drill	Military Drill	Elements of Dairying 4 (2-4)
		Military Drill

JUNIOR

Agricultural Chemistry 2 (2-0), or	American Government 4 (4-0)	General Entomology 4 (3-2)
Quantitative Analysis I 2 (0-4)	Soils 5 (3-4)	Soil Fertility 4 (3-2)
General Geology 4 (4-0)	Principles of Animal Breeding 4 (4-0), or	Elementary Journalism 2 (0-4)
General Bacteriology 4 (2-4)	Plant Breeding 4 (2-4)	
Farm Poultry Production 3 (2-2)	Electives 5 (-)	Electives 8 (-)
Electives 5 (-)		

SENIOR

Economics 4 (4-0), or	Agricultural Economics 4 (4-0), or	Sociology 4 (4-0), or
Sociology 4 (4-0)	Rural Sociology 4 (4-0), or	Economics 4 (4-0)
College Rhetoric II 4 (4-0)	American History I 4 (4-0)	
	Farm Management 4 (3-2)	
Electives 10 (-)	Electives 10 (-)	Electives 10 (-)

*Agricultural Electives for Students in the Course
in Agriculture*

AGRONOMY		
FALL TERM	WINTER TERM	SPRING TERM
Advanced Soils 4 (2-4)	Principles of Agronomic Experimentation 4 (1-6)	Forage Crop Improvement 4 (1-6)
Advanced Farm Mechanics 4 (1-6)	Cereal Crop Improvement 4 (1-6)	Soil Survey 4 (2-4)
	Soil Research 4 (0-8)	Soil Research 4 (0-8)
	Farm Building and Equipment 4 (2-4)	Irrigation and Drainage 4 (2-4)
ANIMAL HUSBANDRY		
History of Breeds and Pedigrees 4 (2-4)	Pork and Mutton Production 3 (0-3)	Live Stock Management II 2 (0-4)
Live Stock Management I 2 (0-4)	Meats 2 (1-2)	Advanced Judging I 2 (0-4)
Advanced Judging II 2 (0-4)		Beef Production 2 (2-0)
Breeding Pure-bred Live Stock 2 (2-0)		Horse Production 3 (3-0)
		Seminar 1 (1-0)
DAIRY HUSBANDRY		
Pure-Bred Dairy Cattle 3 (2-2)	Milk Products and Herd Management 3 (3-0)	Dairy Inspection I 2 (1-2)
Butter-Making & Creamery Management 5 (3-4)		Cheese and Ice Cream Making 4 (2-4)
		Dairy Buildings and Equipment 2 (2-0)
		Advanced Dairy Judging 1 (0-2)
		Dairy Seminar 2 (2-0)
HORTICULTURE		
Pomology I 3 (2-4)	Principles of Orcharding 3 (3-0)	Small Fruits 2 (2-0)
Kitchen Gardening 2 (2-0)	Spraying 3 (1-4)	Ornamental Gardening 2 (2-0)
Advanced Pomology 4 (3-2)		Orchard Management 4 (2-4)
		Market Gardening 3 (2-2)
		Landscape Gardening 3 (2-2)
		Landscape Plans and Materials 3 (2-4)
		Greenhouse Construction & Management 4 (4-0)
MILLING INDUSTRY		
Commercial Grain & Grain Inspection 4 (3-2)	Grain Products 4 (3-2)	Experimental Milling 2 (2-0)
Advanced Experimental Milling 4 (0-8)	Wheat and Flour Testing 4 (1-6)	Experimental Baking Tests 4 (0-8)
POULTRY HUSBANDRY		
Practice in Candling 1 (0-2)	Advanced Judging 2 (0-4)	Practice in Poultry Feeding 1 (0-11½) 4 weeks
Practice in Caponizing and Dressing 1 (0-2)	Poultry Management (Vet.) 2 (2-0)	Practice in Incubation 1 (0-11½) 4 weeks
Breeds and Types 3 (1-4)		Practice in Brooding 1 (0-11½) 4 weeks
FORESTRY		
	Silviculture 3 (2-2)	Farm Forestry 4 (3-2)
Students preparing to teach should take psychology and the educational electives, group 18, electives, for course in general science.		
		Dendrology 2 (1-2)

Table Showing Prerequisites for Agricultural Electives

<i>Subject.</i>	<i>Prerequisites.</i>
History of Breeds and Pedigrees.....	Breeding Types I.
Live Stock Management.....	None.
Pork and Mutton Production.....	Breeding Types I.
Live Stock Management II.....	Breeding Types I.
Advanced Judging I.....	Market Types and Classes, Breeding Types and Classes, Principles of Feeding.
Advanced Judging II.....	Live Stock Management II.
Breeding Pure-bred Live Stock.....	Live Stock Management II.
Meats	Breeding Types I, Live Stock Management I.
Beef Production	Live Stock Management II.
Horse Production	Breeding Types I.
Seminar	Principles of Feeding, Advanced Judging II.
Breeding Types and Classes Vet.....	None.
Forage Crop Improvement.....	Forage Crops.
Principles of Agronomic Experimentation.....	Forage Crops, Advanced Grain Judging, Soils, and Principles of Breeding.
Advanced Grain Judging.....	Cereal Crop Production.
Cereal Crop Improvement.....	Forage Crops, Taxonomic Botany and Principles of Breeding.
Soil Survey	Principles of Agronomic Experimentation.
Advanced Soils	Geology, Principles of Agronomic Experimentation.
Soil Research I.....	Advanced Quant. Anal. (four credits), Soil Bacteriology and Soil Research II.
Soil Research II.....	Farm Mechanics.
Advanced Farm Mechanics.....	Forage Crop Improvement.
Farm Building and Equipment.....	Forage Crop Improvement.
Irrigation and Drainage.....	Forage Crop Improvement, Advanced Grain Judging.
Dairy Inspection I.....	Genl. Bact., Chem. D. I and D. II.
Pure-bred Dairy Cattle.....	None.
Butter-making and Creamery Management.....	None.
Cheese and Ice Cream Making.....	Chem. D. I and D. II and Dairy Bacteriology.
Dairy Buildings and Equipment.....	None.
Advanced Dairy Judging.....	Dairy Judging.
Dairy Seminar	Elements of Dairying, Dairy Inspection I, Pure-bred Dairy Cattle, Milk Production, and Herd Management.
Dairy Inspection Vet.....	None.
Dairy Judging Vet.....	None.
Farm Forestry	None.
Dendrology	None.
Silviculture	Farm Forestry.
Pomology	None.
Kitchen Gardening	None.
Small Fruits	Plant Propagation.
Ornamental Gardening	None.
Advanced Pomology	Pomology I.
Principles of Orcharding.....	Plant Propagation, Advanced Pomology.
Spraying	Chem. I, 2.
Orchard Management	None.
Market Gardening	None.
Landscape Gardening	None.
Landscape Plans and Materials.....	None.
Greenhouse Construction and Management.....	None.
Commercial Grain and Grain Inspection.....	Cereal Crop Production.
Grain Products	Commercial Grain and Grain Inspection.
Experimental Milling	Grain Products.
Advanced Experimental Milling.....	Experimental Milling.
Wheat and Flour Testing.....	Commercial Grain and Grain Inspection, Grain Products, and Quantitative Analysis (six credits).
Experimental Baking Tests.....	Wheat and Flour Testing.
Practice in Poultry Feeding.....	None.
Practice in Incubation.....	None.
Practice in Brooding	Practice in Poultry Feeding.
Practice in Candling	None.
Practice in Caponizing and Dressing.....	None.
Breeds and Breed Types.....	None.
Advanced Judging	Practice in Caponizing and Dressing.
Poultry Management Vet.....	None.

NOTE.—For electives in other subjects, see the course in general science.

Course in Veterinary Medicine

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN		
FALL TERM	WINTER TERM	SPRING TERM
Anatomy I 6½ (1-11)	Anatomy II 6½ (1-11)	Anatomy III, 4 (1-6)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry IV, 5 (2-6)
General Zoölogy I 4 (2-4)	General Zoölogy II 4 (2-4)	Embryology 4 (2-4)
Market Types and Classes of Stock (4 1-6)	Histology I 4 (2-4)	Histology II 4 (2-4)
Military Drill	Poultry Management 2 (2-0)	Breeding Types I 4 (1-6)
	Military Drill	Military Drill
SOPHOMORE		
Anatomy IV, 5 (2-6) <i>or</i> Anatomy III, 4 (1-6)	Anatomy V 4 (1-6)	Anatomy VI 8 (1-4)
Histology III 4 (2-4)	Comparative Physiology I 7 (5-4)	Comparative Physiology II 7 (5-4)
El. Organic Chemistry 4 (4-0)	Qualitative Analysis 4 (2-4)	Principles of Feeding 4 (4-0)
Medical Botany 3 (1-4)	Pathogenic Bacteriology I 4 (2-4)	
English I 4 (4-0)	English II 4 (4-0)	College Rhetoric I 4 (4-0)
Military Drill	Military Drill	Military Drill
JUNIOR		
Pathology I 7 (5-4)	Pathology II 7 (4-6)	Pathology III 7 (4-6)
Materia Medica I 4 (4-0)	Materia Medica II 2 (2-0)	
Pharmacy 3 (1-4)	Therapeutics I 2 (2-0)	Therapeutics II 4 (4-0)
Surgery I 3 (3-0)	Surgery II 3 (3-0)	Surgery III 3 (3-0)
Diagnosis 3 (3-0)	Medicine I 3 (3-0)	Medicine II 3 (3-0)
Clinic 6 (0-12)	Pathogenic Bacteriology II 4 (2-4)	Serum Therapy 4 (3-2)
	Clinic 6 (0-12)	Clinic 6 (0-12)
SENIOR		
Surgery IV 3 (3-0)	Surgery V 3 (3-0)	Surgery VI 7 (4-6)
Medicine III 3 (3-0)	Infectious Diseases 4 (4-0)	Sanitary Medicine 4 (4-0)
History of Breeds and Pedigrees 4 (2-4)	Principles of Animal Breeding 4 (4-0)	Conformation & Soundness 2 (2-0)
Horseshoeing 2 (2-0)	Parasitology 3 (2-2)	Meat Inspection 4 (4-0)
Operative Surgery I 2 (0-4)	Operative Surgery II 2 (0-4)	Dairy Inspection II 2 (0-4)
Obstetrics 5 (4-2)	Jurisprudence 2 (2-0)	
Clinic 6 (0-12)	Ophthalmology 2 (2-0)	
	Clinic 6 (0-12)	Clinic 6 (0-12)

Agronomy

Professor CALL, Soils.
Assistant Professor LEIDIGH, Crops.
Assistant Professor _____, Farm Crops.
Instructor SCHAFER, Crops.
Instructor _____, Farm Crops.
Assistant CUNNINGHAM, Farm Demonstrations.
_____, Farm Mechanics.
_____, Soils.
Assistant WILSON, Farm Demonstrations.
_____, Crops.
Assistant THROCKMORTON, Soil Survey.
Fellow, C. MYSZKA, Soils.
Fellow, A. L. NELSON, Soils.

The College farm used by the Department of Agronomy comprises 320 acres of medium rolling upland soil, well suited to experimental and demonstration work. It is well equipped with all kinds of farm machinery necessary in crop production. The general fields and experimental plots used for the breeding and testing of farm crops, and for conducting soil fertility experiments and experiments in methods of soil culture, afford the student excellent opportunities for study and investigation.

A large and well-equipped laboratory for soil physics and soil-fertility work is maintained for the regular use of students. Laboratories for grain judging and crop judging are maintained for students taking this work. Material is provided for the use of the students in the study and determination of the grains and forages best adapted to different purposes and most suitable for growing under different soil and climatic conditions. Ample greenhouse space is provided for the students' use in germinating seeds under varying soil-moisture conditions, at different depths of planting, and with varying degrees of temperature; and for research work in soils during the winter months.

The farm-mechanics laboratory is well supplied with representative types of farm machinery for demonstration and illustrative purposes in farm mechanics. Different makes of all kinds of farm machinery are supplied by implement manufacturers for study and investigation.

The Department of Agronomy offers courses in grain judging, crop production, soil physics, soil fertility, soil surveying, farm mechanics, irrigation and drainage, and farm management.

The following detailed description of courses will give a definite understanding of each subject given, its position in the course, and the proportion of time devoted to class and to laboratory work:

COURSES IN FARM CROPS

1.—CEREAL CROP PRODUCTION. Sophomore year, fall term. Class work, three hours; laboratory, four hours. Five credits. Required in the course in agriculture; elective in the course in general science.

This course is a study of cereal crops, largely from a production viewpoint. The crops considered are corn, wheat, oats, barley, rye, rice, buckwheat, and grain sorghum. The origin, the history of development, and the factors influencing growth, are studied. Facts designating the best place in a rotation of crops are presented. Proper seed-bed preparation, cultural methods, and factors which tend to maximum production, receive highest consideration.

Laboratory.—In the laboratory a study of the physical characters of each of the cereal crops is made.

2.—FORAGE CROPS. Sophomore year, winter term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in agriculture; elective in the course in general science. Prerequisite: Cereal Crop Production.

This course includes a study of forage and fiber crops, with special reference to history, method of development, growth, distribution, culture, and uses. The culture and the adaptation of perennial grasses for hay and pasture are considered. Annual forage crops, including sorghums, rape, millets, legumes, and cereals, are studied with reference to their production and uses for pasture, silage, soiling, fodder, and hay.

Laboratory.—In the laboratory both sheaf and mounted specimens of forage crops are studied. In the greenhouse about fifty types of forage plants are kept growing for laboratory use. The student is, therefore, given an opportunity to become familiar with the structure and growth of many forage plants. A study is made of the different commercial tame grasses and clovers and their seeds, with special reference to quality, purity, and freedom from adulterants and weed seeds.

3.—FORAGE CROP IMPROVEMENT. Senior year, fall term. Class work, one hour; laboratory, six hours. Four credits. Elective in the course in agriculture. Prerequisite: Principles of Breeding.

This is an advanced course in forage crops and their improvement, especially from the breeder's standpoint. The lectures deal with forage-crop investigations.

Laboratory.—The laboratory period is devoted to the collecting, compiling, classifying and card-indexing of the data on this subject. Special subjects are assigned to each student for presentation to the class. The individual desires of each student and his interest in a particular crop are allowed to govern assignments of subjects.

4.—PRINCIPLES OF AGRONOMIC EXPERIMENTATION. Senior year, winter term. Class work, one hour; laboratory, six hours. Four credits. Elective in the course in agriculture. Prerequisites: Forage Crops, Soil Fertility, Forage Crop Improvement, and Principles of Breeding.

This is an advanced course in technical experimentation along agronomic lines. The lectures deal with the history and development of experiments with soils and field crops. Attention is called to the arrangement of the crops on an experiment farm as regards adaptation to soil and topography. The size, the management, and the shape of plots for crop and soil, or joint research, are considered. The method and theory of check plats and the duplication of experiments are discussed. The residual effects and the seasonal influences and their effects upon the following year's work are considered, together with means of overcoming these factors. The methods of experimentation followed at various stations are discussed.

Laboratory.—The laboratory period is devoted to the working out of results secured in actual experimental operations and the compiling of these data.

5.—ADVANCED GRAIN JUDGING. Senior year, fall term. Laboratory, four hours. Two credits. Elective in the course in agriculture. Prerequisite: Agronomy 1.

This course consists of the study of grain. It includes the determination of moisture and the effect of excessive moisture on the quality of grain. A study is made of the effect of mixed varieties and foreign material upon quality. These studies are made with reference to conditions during production, harvesting, and marketing. The course includes the judging and commercial grading of grain.

6.—**CEREAL CROP IMPROVEMENT.** Senior year, spring term. Lecture, one hour; laboratory, six hours. Four credits. Elective in the course in agriculture. Prerequisites: Forage Crops, Taxonomic Botany, and Principles of Breeding.

This is an advanced study of the cereal crops and methods for their improvement. The laws and principles underlying the breeding of cereals are given special attention. The lectures deal with systems of grain crop management and factors affecting their improvement.

Laboratory.—The laboratory period is used partly for the collection, reading and classification of material concerning cereal improvement. Various assignments are given the students. So far as possible, the individual desires of each student and his interest in a particular crop are allowed to govern the assignment of subjects.

COURSES IN SOILS

7.—**SOILS.** Junior year, winter term. Class work, three hours; laboratory, four hours. Five credits. Required in the course in agriculture; elective in the course in general science. Prerequisites: Agricultural Chemistry, Geology, and Bacteriology.

This course comprises a study of the physical nature of soils, and deals with the origin of soils and their formation; soil texture as influencing aération, capillarity and diffusion; soil moisture and means for its conservation; the washing of soils and preventive measures; the effect of different methods of cultivation upon the liberation of plant foods, soil moisture, and soil temperature; the use of tillage implements and their effect upon the physical condition of the soil.

Laboratory.—The practicums demonstrating the principles of soil physics are discussed in the class.

8.—**SOIL FERTILITY.** Junior year, spring term. Class work, three hours; laboratory, two hours. Four credits. Required in course in agriculture; elective in course in general science. Prerequisites: Agricultural Chemistry, Quantitative Analysis 1, and Soils.

This course involves a study of the food combinations of plants and the effect of different amounts of combinations of plant food upon plant growth; the effect of different crops and different systems of farming upon the depletion of soil fertility; the use of barnyard manure, including proper methods of handling, preserving, and applying it; a determination of the need of soils for commercial fertilizers and the kind of fertilizers to apply.

Laboratory.—The laboratory exercises supplement the class work in demonstrating the effect of fertilizers and manures upon plant growth.

9.—**SOIL SURVEY.** Junior year, spring term. Lectures and recitations, two hours; laboratory, four hours. Four credits. Elective in the course in agriculture. Prerequisite: Soils.

This subject is pursued by lectures and recitations on the types of soil of the United States as classified by the Bureau of Soils, United States Department of Agriculture, and the adaptability of different crops to these soil classes. A study is also made of the soil surveys of different states, and especially of the soil survey of Kansas.

Laboratory.—Field work in mapping soils comprises the laboratory work.

10.—**ADVANCED SOILS.** Senior year, fall term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in agriculture. Prerequisites: Geology, Soils.

This course is a brief study of the principal soil-forming rocks and minerals and their influence upon the texture, physical properties and fertility of the soil. The various methods of determining the physical composition of the soil are considered.

Laboratory.—The laboratory is a continuation of the work begun in Soils.

11.—SOIL RESEARCH I. Senior year, winter term. Laboratory, eight hours. Four credits. Elective in the course in agriculture. Prerequisites: Advanced Quantitative Analysis (four credits), Soil Bacteriology, and Advanced Soils.

The student taking this course pursues a definite line of laboratory work on some soil problem. During the winter term the work is principally in the greenhouse and the laboratory, but includes assigned readings. In the spring term an opportunity is afforded to carry into the field lines of research started in the greenhouse and the laboratory.

12.—SOIL RESEARCH II. Senior year, spring term. Laboratory, eight hours. Four credits. Elective in the course in agriculture. Prerequisite: Soil Research I.

This course is a continuation of Soil Research I.

COURSES IN FARM MECHANICS

13.—FARM MECHANICS. Sophomore year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in agriculture; elective in the course in general science.

This is a beginning course in farm mechanics, taking up certain important definitions and mechanical principles—force, work, power, and the lever, eveners, tackles, etc. It includes a study of power transmission, belting, splicing, etc., strength of materials, tillage machinery, history, development and construction of plows, harrows, rollers, subsurface packers, cultivators, etc., and also a study of seeding, grading, harvesting, haying, threshing, guiding and pumping machinery.

14.—ADVANCED FARM MECHANICS. Senior year, fall term. Lectures, one hour; laboratory, six hours. Four credits. Elective in the course in agriculture. Prerequisite: Farm Mechanics.

Different makes of implements are compared as to simplicity of construction, draft, and adaptability to the purpose for which manufactured. Practical field and laboratory tests of farm machines are conducted with various forms of power. Appropriate instruction is given in the care of all classes of farm implements.

15.—FARM BUILDINGS AND EQUIPMENT. Senior year, winter term. Lectures, two hours; laboratory, four hours. Four credits. Elective in the course in agriculture. Prerequisite: Farm Mechanics.

This subject involves a study of the permanent equipment and conveniences of the farm, such as fences, outbuildings, cribs, barn, and machine sheds. The use of concrete for construction work on the farm will be given special attention.

16.—IRRIGATION AND DRAINAGE. Senior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in agriculture. Prerequisites: Farm Mechanics, Soil Fertility.

This course involves study and field practice in the fundamentals common to both irrigation and drainage. Problems are given on the length of pace, and on the determination of distances by pacing and by the use of the surveyor's chain, and farm mapping. A study is made of drainage systems in operation. The College has a drainage system under way, and practical work is given the students in running levels and in trenching and placing tile. Each student is required to plan an entire drainage system and to estimate its cost.

COURSE IN FARM MANAGEMENT

17.—FARM MANAGEMENT. Senior year, winter term. Lectures and recitations, three hours; laboratory, two hours. Four credits. Required in the course in agriculture; elective in the course in general science. Prerequisites: Forage Crops, Soil Fertility.

The purpose of this course is: first, to assemble and correlate the principles involved in the agricultural subjects taught in the institution; second, to aid the student in applying these principles to the successful management of a farm. Lectures are given on the points to be considered in the selection of a farm, on types of farming, on the planning and arrangement of the farmstead and of the fields and the crops; on the ease, cost and methods of marketing different farm products. Different regions are discussed with especial reference to their adaptability to certain types of farming. Farm records and accounts are kept. The labor question is analyzed. The distribution of capital, its relation to profit, and the relation of live stock to crop production and to the maintenance of a permanent agriculture, receive consideration. Rural conditions with respect to people, roads, schools, churches and social conveniences also find consideration in the course. Methods of renting and leasing farms are discussed, and their important points emphasized.

Laboratory.—At the beginning of the course the students are required to furnish plans and inventories of their own farms or of a farm with which they are familiar, together with a financial record of one year's actual operations. The farm is then replanned in accordance with the principles developed in this course. Whenever practicable, neighboring farms are visited and studied with the idea of securing first-hand information as to the farm plan, especially with respect to the arrangement of the fields, to the buildings, to the farmstead, and to the rotation of crops used. Text, Warren's *Farm Management*.

Animal Husbandry

Professor COCHEL.
Assistant Professor McCAMPBELL.
Assistant Professor _____.
Instructor WRIGHT.
Instructor VESTAL.
Assistant LEWIS.
Assistant BLIZZARD.
Assistant _____.

The Department of Animal Husbandry owns about 140 acres of land and rents 300 acres for the maintenance of herds and flocks of pure-bred horses, cattle, sheep, and hogs. The College live stock has attained a national reputation among breeders and feeders on account of the many prize-winning animals produced.

The feed yards and barns are well arranged for experimental feeding and the maintenance of the herds. The laboratory of the animal husbandry student is, as a matter of fact, the feed yard and the animal. He studies the animal from the standpoint of the breeder and of the feeder, and learns to combine the needs of each and to find these qualities exemplified in the perfect animal.

The courses of study in this department are so arranged as to give the student special instruction in the selection, breeding, feeding, marketing and management of all classes of live stock. Attention is also given to the sanitary conditions and treatment of the more common forms of disease to which the animals are subject.

COURSES IN ANIMAL HUSBANDRY

1.—MARKET TYPES AND CLASSES. Freshman year, fall term. Class work, one hour; laboratory, six hours. Four credits. Required in all agricultural courses and in the agricultural and general science options in the course of industrial journalism; elective in the course in general science.

This course consists of a study of the market types and classes of horses, cattle, sheep, and swine. Text, Craig's *Live-stock Judging*.

Laboratory.—Practice in scoring and judging animals.

2.—BREEDING TYPES AND CLASSES. Freshman year, winter term. Class work, one hour; laboratory, six hours. Four credits. Required in all agricultural courses; elective in the courses in general science, veterinary medicine, and industrial journalism. Prerequisite: Market Types and Classes.

This course consists of a study of the types and classes of horses, cattle, sheep and swine from the standpoint of both grade and pure-bred animals used for breeding purposes. Text, Craig's *Live-stock Judging*.

Laboratory.—Practice in scoring and judging breeding animals.

3.—BREEDING TYPES I. Freshman year, spring term. Class work, one hour; laboratory, six hours. Four credits. Special course for veterinary students only. Prerequisite: Market Types and Classes.

This course consists of a study of the more important breeds of horses, beef cattle, dairy cattle, sheep, and swine. One-third of the time required in this course is devoted to the study of dairy cattle, during which time the class is in charge of the Department of Dairy Husbandry. Text, Craig's *Live-stock Judging*.

Laboratory.—Practice is given in scoring and in judging.

4.—PRINCIPLES OF FEEDING. Sophomore year, spring term. Lecture, two hours; recitation, two hours. Four credits. Required in all agricultural courses, in the course in veterinary medicine, and in the course in industrial journalism. Prerequisites: Market Types and Classes, and Breeding Types and Classes.

This course involves a study of the digestive system and the processes of nutrition, and of the theory of practical economy of rations, both for the maintenance and for the fattening of all classes of farm animals.

5.—HISTORY OF BREEDS AND PEDIGREES. Junior year, fall term. Class work, two hours; laboratory, four hours. Four credits. Required in the animal husbandry course. Prerequisite: History of Breeds and Pedigrees.

A study of the early history and development of pure-bred domestic animals. Also a sufficient study of herd books and pedigrees to acquaint students with the leading strains and families of the different breeds of horses, cattle, sheep, and swine. Text, Plumb's *Types and Breeds*.

6.—LIVE-STOCK MANAGEMENT I. Junior year, fall term. Laboratory, four hours. Two credits. Required in animal husbandry course.

Practice in feeding, care, and management of cattle and hogs.

7.—PRINCIPLES OF ANIMAL BREEDING. Junior year, winter term. Class work, four hours. Four credits. Required in all of the agricultural courses, in the course in veterinary medicine, and the course in industrial journalism. Prerequisites: Zoölogy I, II, and III; Embryology.

This course embraces the general study of the principles of breeding, including a study of selection, variation, heredity, atavism, etc. Text, Davenport's *Thremmatology*.

8.—PORK AND MUTTON PRODUCTION. Junior year, winter term. Class work, three hours. Three credits. Required in the course in animal husbandry. Prerequisite: Principles of Feeding.

This course comprises a systematic study of the most successful and economical methods of growing and finishing hogs and sheep, both for breeding purposes and for pork and mutton production.

9.—LIVE-STOCK MANAGEMENT II. Junior year, spring term. Laboratory work, four hours. Two credits. Required in the course in animal husbandry. Prerequisite: Principles of Feeding.

This course deals with the practical side of the feeding, care and management of horses and sheep.

10.—ADVANCED JUDGING I. Junior year, spring term. Laboratory, four hours. Two credits. Required in the course in animal husbandry. Prerequisites: Market Types and Classes, Breeding Types and Classes, and History of Breeds and Pedigrees.

This course deals with the judging of market classes as well as with all of the different breeds of pure-bred stock. The stock is judged in groups of from four to six animals in the same manner that is customary at county or state fairs.

11.—ADVANCED JUDGING II. Senior year, fall term. Laboratory, four hours. Two credits. Required in the course in animal husbandry. Prerequisite: Advanced Judging I.

A continuation of Advanced Judging I. During the work of this term, occasional trips are made to the best live-stock farms of the state, where the students have an opportunity to judge and to observe the management of herds and flocks as handled by the most successful stockmen of the state.

12.—BREEDING PURE-BRED LIVE STOCK. Senior year, fall term. Two credits. Prerequisite: Advanced Judging I.

A study of the practices in breeding pure-bred live stock.

13.—MEATS. Senior year, winter term. Class work, one hour; laboratory, two hours. Two credits. Required in the course in animal husbandry. Prerequisites: Principles of Feeding, and Principles of Animal Breeding.

This course includes a study of the killing, dressing, cutting, and curing of beef, pork, and mutton.

14.—BEEF PRODUCTION. Senior year, spring term. Class work, two hours. Two credits. Required in the course in animal husbandry. Prerequisite: Advanced Judging I.

This course is devoted to a study of the most successful and economical methods of producing beef cattle for market. Various rations, comparisons of long and short feeds, the advisability of grain and of grass feed, and all questions pertaining to the production of beef are considered.

15.—HORSE PRODUCTION. Senior year, spring term. Class work, three hours. Three credits. Required in the course in animal husbandry. Prerequisite: Principles of Feeding.

This course involves a study of the most successful methods of growing and developing young horses and mules and of the most satisfactory rations for horses, together with an investigation of the best methods of preparing horses for market.

16.—SEMINAR. Senior year, spring term. One credit. Prerequisites: History of Breeds and Pedigrees, and Breeding Pure-bred Live Stock.

Dairy Husbandry

Professor REED.
Instructor RUDNICK.
Instructor FITCH.
Assistant TOMSON.

The college dairy farm, including the buildings and yards, consists of about seventy acres of medium upland. This land is used for growing corn, alfalfa, and other crops, such as cowpeas, field peas, and sorghum, and for the pasture of the dairy herd.

The barn is built on the most approved model for the housing of dairy cattle, and is light, well-ventilated, and sanitary, with stalls for seventy cows. Three silos of modern type, feed rooms, a milk room, a boiler room, and a laboratory exist in connection with the barn. Each of these illustrates some especially desirable feature in dairy building and construction.

The dairy herd consists of excellent types of the four dairy breeds: Jersey, Guernsey, Ayrshire, and Holstein. These animals are pure-bred and a number have been entered in the advanced registry of their respective breeds. The Department of Dairy Husbandry purposes to keep one animal for each acre in cultivation, raising all of the corn needed for silage, as well as alfalfa necessary for the animal for one year, and furnishing all of the pasture required by the young stock.

The dairy building houses the creamery, the cheese rooms, the classrooms, and the offices, and the necessary laboratories for testing and hand-separator work. Refrigeration is secured from a small refrigerating machine and ice plant installed in the building. These facilities of barn, herd, and laboratories are in constant use by the students of dairying. The instruction in dairy husbandry includes the study of the selection and breeding of dairy animals, the production of milk, its manufacture into butter, cheese, and other dairy products, or its sale on the market.

COURSES IN DAIRY HUSBANDRY

1.—ELEMENTS OF DAIRYING. Sophomore year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in all of the courses in agriculture and in the agricultural option in the course in industrial journalism; elective in the course in general science.

This is a general course in dairying, dealing with the secretion, composition and properties of milk, with the factors influencing the quantity and quality of milk, and with the care of milk and cream on the farm. It includes a study of the different methods of creaming, the construction and operation of farm separators, the principles and application of the Babcock test, the use of the lactometer, and butter making on the farm. Lectures, supplemented by text, Wing's *Milk and Its Products*.

Laboratory.—Practice in operating the Babcock test and lactometer, separation of milk, and farm butter making.

2.—DAIRY JUDGING. Freshman year, spring term. Laboratory, four hours. Two credits. Required in the courses in agriculture, in the course in veterinary medicine, and in the agricultural option in the course in industrial journalism; elective in the course in general science.

This course calls for the judging of dairy stock from the standpoint

of economical production and breed type. Score cards are used for the purpose of training the student to become accurate, thorough and systematic in the selection of animals as representatives of breeds or for breeding purposes. No textbook is required. *Types and Breeds of Farm Animals*, by C. S. Plumb, and Breed Association literature are used as references.

3.—BREEDING TYPES I. Freshman year, spring term. Required in the course in veterinary medicine.

One-third of this course, which is described more fully under the Department of Animal Husbandry, is given by members of the Department of Dairy Husbandry, and comprises the judging and scoring of dairy cattle.

4.—DAIRY INSPECTION I. Junior year, spring term. Class work, one hour; laboratory, two hours. Two credits. Required in the course in dairy husbandry. Prerequisites: General Bacteriology; Chemistry D-I and D-II.

Advanced work is given in the testing of dairy products, including testing for adulterations. Practice is given in the use of score cards for inspecting and grading milk depots, dairy farms, and creameries. The course is designed to give training in the duties of a city, state or government inspector or commissioner. State and city ordinances governing the handling and public sale of dairy products are outlined. Text, Farrington and Woll's *Testing Milk and Its Products*.

5.—PURE-BRED DAIRY CATTLE. Junior year, fall term. Class work, two hours; laboratory, two hours. Three credits. Required in the course in dairy husbandry.

Lectures are given on the origin, history and development of breeds of dairy cattle, their distribution, and their distinctive characteristics.

Laboratory.—This work consists of a study of methods of registering animals, and of practice in tracing and making pedigrees and in keeping advanced registry records.

6.—MILK PRODUCTION AND HERD MANAGEMENT. Junior year, winter term. Class work, three hours. Three credits. Required in the course in dairy husbandry. Prerequisite: Principles of Feeding.

This course deals with the economical production of milk and with the most approved methods of handling a dairy herd. Special attention is given to breeding, feeding, keeping herd records, forming test associations, and organizing plans for improvement of quality of dairy cattle.

7.—BUTTER MAKING AND CREAMERY MANAGEMENT. Senior year, fall term. Class work, three hours; laboratory, four hours. Five credits. Required in the course in dairy husbandry.

This course comprises a study of the principles of creamery butter making, the construction and care of creameries and their appliances, methods of sampling and grading cream, pasteurization, starter making, cream ripening, and creamery accounting. Text, McKay and Larson's *Principles and Practice of Butter Making*.

Laboratory.—Practice is given in the sampling and grading of milk and cream; in separating and ripening cream; in the preparation and use of the starter in pasteurized and in raw cream; in churning; in working, washing, salting and packing of butter; and in keeping complete records of each operation. The work also includes the making of salt, fat and moisture determinations of the finished product, and judging and scoring butter.

8.—CHEESE AND ICE-CREAM MAKING. Senior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in dairy husbandry. Prerequisites: Chemistry D-I and D-II; Dairy Bacteriology.

This course includes the making of cheese on the farm for home use and for sale, and the commercial manufacture of cheddar cheese, comprising each detail from the receipt of the milk to the marketing of the finished product. The cheese work is given in the first half of the term; the manufacture and handling of ice cream and ices for the retail and wholesale trade in the second half. Text, Van Slyke-Publow's *The Science and Practice of Cheese Making*.

Laboratory.—Practice is given in making cheese under farm conditions and on a commercial scale. Records are kept of the different operations, and their influence upon the finished product is noted. Exercises are given in testing, judging and scoring cheese. The latter half of the term is devoted to the making of ice cream and ices.

9.—DAIRY BUILDINGS AND EQUIPMENT. Junior year, spring term. Class work, two hours. Two credits. Required in the course in dairy husbandry.

This work consists in drawing plans for the construction of dairy barns, storage barns, silos, milk rooms, dairies, ice houses, fences, and shelters, and in planning and laying out dairy plants for special purposes.

10.—ADVANCED DAIRY JUDGING. Elective, spring term. Laboratory, two hours. One credit.

This course is a continuation of Live Stock III. Visits are made to the best dairy farms in the State, and students are given an opportunity to judge and to handle stock kept by the most successful breeders.

11.—DAIRY SEMINAR. Elective, spring term. Class work, two hours. Two credits. Prerequisites, courses 1, 4, 5, and 6.

This course includes a study and review of dairy periodicals and experiment station bulletins, books, and other dairy literature.

12.—DAIRY INSPECTION II. Senior year, spring term. Laboratory, four hours. Two credits. Required in the course in veterinary medicine.

This course comprises the testing of dairy products, the inspection and scoring of dairies and milk depots, and the testing for adulterants in dairy products. Text, Farrington and Woll's *Testing Milk and Iis Products*.

Forestry

Forester SCOTT.

The Department of Forestry, established by authority of an act of the legislature in 1909, is in charge of forestry extension and investigations throughout the State, and of the College instruction in these subjects.

The great importance to State and nation of conserving the present area of woodland and of adding to it by plantings upon every farm is universally acknowledged. The direct value to the farm of supplies of posts, poles, and fuel is readily computed, but the value to the State of these timber areas in the protection to soil, conservation of moisture, and improved landscape effect, is even more important in the agricultural welfare of the State and of the citizen.

COURSES IN FORESTRY

1.—FARM FORESTRY. Junior year, winter term. Class work, three hours; laboratory, two hours. Four credits. Required in all agricultural courses; elective in the course in general science.

This course covers, in a general way, the propagation of forest trees;

nursery methods and practices; the cultivation and care of trees in farm wood-lots; the preparation of planting plans for farm wood-lots; a detailed study of trees suitable for such planting in the various parts of the State; the value of the timber crop; the composition and location of windbreaks, their value in the protection of growing crops and in the conservation of soil moisture. Lectures and mimeographed notes.

2.—**DENDROLOGY.** Elective, winter term. Class work, one hour; laboratory, two hours. Two credits. Elective in the agricultural courses and in the course in general science. This course takes up the classification and identification of forest trees growing on the campus and in the vicinity of Manhattan, by means of bud and twig characteristics, as well as by leaf, flower and fruit characteristics.

3.—**SILVICULTURE.** Junior year, winter term. Class work, two hours; field work, two hours. Three credits. Required in the horticultural course; elective in other courses. Prerequisite: Farm Forestry.

A study of the forest regions of the United States; the commercial range of the important economic species, their soil and climatic requirements; a study of forest types; tolerance and intolerance of trees; factors determining reproduction and rate of growth; the protection of forests against injury by fires, winds, and insects, including the application of several silvicultural systems.

Horticulture

Professor DICKENS.
Assistant Professor AHEARN.
Assistant LEWIS.
Assistant COOPER.

A wealth of illustrative material for classes in all horticultural subjects is found in the large collection of species growing upon the College campus, in the orchard plantations, and in the greenhouses. The new greenhouses have added greatly to the possibility of effective laboratory work.

The horticultural grounds consist of eighty acres of land devoted exclusively to horticultural and forestry work and gardens, and to nurseries. Orchards and vineyards are maintained for experimental and demonstrative work. A full equipment of tools, spraying machinery, and special apparatus used in horticulture, floriculture and gardening is available for the use of the students. The College grounds furnish one of the finest laboratories in the State for the study of landscape gardening.

The instruction in the Department of Horticulture covers fruit judging, plant propagation, pomology, gardening, small fruits, spraying, orcharding, and landscape gardening. The following descriptions give detailed accounts of the instruction in these various fields.

COURSES IN HORTICULTURE

1.—**PLANT PROPAGATION.** Sophomore year, spring term. Class work, three hours; laboratory, four hours. Five credits. Required in all the agricultural courses and in the course in industrial journalism; elective in the course in general science. Prerequisite: Plant Anatomy.

A discussion of natural and cultural methods of propagation; seeds, seed testing, and seed growing; the treatment required for different kinds of seeds, the production of seedlings for stock; grafting, budding, layering; the making of cuttings, and the special requirements for

propagating commercial fruits and ornamental plants. Lectures and assigned readings.

Laboratory.—Practical work in the preparation of seeds and in seed testing; in the preparation of seed-beds, and the use of seeding machinery; in transplanting, grafting, budding, and in general nursery practice.

2.—POMOLOGY I. Junior year, fall term. Class work, two hours; laboratory, four hours. Three credits. Required in the course in horticulture.

Exercises in grading and packing fruit, in selecting specimens, and in the preparation of exhibits. Identification and description of varieties; identification of diseases and of injuries which damage storage fruits.

3.—KITCHEN GARDENING. Senior year, fall term. Class work, two hours. Two credits. Required in the course in home economics.

Lectures on the requirements for home-grown vegetables and other plants; on soils, fertilizers, and seeds; on the planting, cultivation and needs of various groups of species.

4.—SMALL FRUITS. Junior year, spring term. Class work, two hours. Two credits. Required in the course in horticulture. Prerequisite: Plant Propagation.

The small fruits of commercial importance are considered with reference to their requirements as to soil, fertilizers, cultivation, and protection. The management of small areas designed to furnish a supply of fruits for home use, and the handling of commercial plantations, are considered.

5.—ORNAMENTAL GARDENING. Senior year, spring term. Class work, two hours. Two credits. Required in the course in home economics and in the home economics option in the course in industrial journalism.

Lectures are given on the principles of landscape art and their application to the problems of lawns, yards, country homes, and school grounds. Opportunity is afforded for an acquaintance with the species used for obtaining the best results.

6.—ADVANCED POMOLOGY. Senior year, fall term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in horticulture. Prerequisite: Pomology I.

The course comprises a detailed study of systems of classification, natural and artificial, and of the influence of conditions and culture upon variation. Systems of description and nomenclature are treated. Text, Waugh's *Systematic Pomology*.

Laboratory.—The laboratory work consists of identification and description of varieties; observations on variations in specimens grown in different localities and under varying conditions.

7.—PRINCIPLES OF ORCHARDING. Senior year, winter term. Class work, three hours. Three credits. Required in the course in horticulture. Prerequisites: Plant Propagation; Advanced Pomology.

This course consists of a discussion of the conditions necessary for success with orchards, including location, improvement of soil, application of fertilizers, pruning. Text, Bailey's *Principles of Fruit Growing*.

8.—SPRAYING. Senior year, winter term. Class work, one hour; laboratory, four hours. Three credits. Required in the course in horticulture. Prerequisites: Chemistry I and II.

Practice is given in preparing spray mixtures, and in the use of spraying machinery.

9.—ORCHARD MANAGEMENT. Class work, two hours; laboratory, four hours. Four credits.

This is a detailed study of the capital and equipment necessary for

the handling of orchards of varying age and size, and of requirements of marketing, storage, and by-products.

10.—**MARKET GARDENING.** Senior year, spring term. Class work, two hours; laboratory, two hours. Three credits. Required in the course in horticulture.

This course comprises a study of the problems and possibilities of the market garden, the necessary equipment, and soil requirements therefor; the value and cost of fertilizers. Text, Bailey's *Principles of Vegetable Gardening*.

Laboratory.—The laboratory work consists of the preparation of plans for gardens; seed testing; the construction of the hotbed; the use of tools and machines; observations on the growth of crops; management of hotbeds and forcing houses.

11.—**LANDSCAPE GARDENING.** Senior year, spring term. Class work, two hours; laboratory, two hours. Three credits. Required in the course in horticulture; elective in the course in general science.

This course is a study of the ideals of landscape work, and the means adopted to secure the best results in lawns, parks, public grounds, and cemeteries. Text, Waugh's *Landscape Gardening*.

Laboratory.—The laboratory work is in making plans for plantings of various types, including lawns, parks, and cemeteries.

12.—**LANDSCAPE PLANS AND MATERIALS.** Class work, two hours; laboratory, four hours. Three credits.

This elective deals with plans for street planting, the ornamentation of school grounds, city parks, and home grounds. A thorough study is made of landscape principles that apply to civic improvement.

Laboratory.—There are field trips, and the students are required to familiarize themselves with the more common varieties of flowers, shrubs, and trees.

13.—**GREENHOUSE CONSTRUCTION AND MANAGEMENT.** Class work, four hours.

This course consists of a term's work covering the more important points of greenhouse construction and the proper methods of conducting the greenhouse business. Not only is this subject treated from the commercial standpoint, but the management of private conservatories is also carefully studied.

Milling Industry

Professor FITZ.
Assistant DUNTON.
_____, Miller.

The Department of Milling Industry was primarily established by the Board of Regents to undertake investigations in the handling, marketing and milling of wheat. Every student of agriculture should have some knowledge of this subject, and also of the handling of grain products other than those obtained from wheat. A full and complete knowledge of the needs of grain growing as an industry must necessarily include the utilization of grains in the manufacture of food, together with the natural by-products resulting therefrom.

The department has a well-equipped plant, consisting of six double-stand 7" x 14" rolls, with necessary cleaning machinery and dust collectors, sifters, and purifiers. The results secured here are comparable with those from a regular commercial mill. A baking laboratory

equipped with proofing closet, dough mixer, and electric ovens is open for student use, as is also a laboratory for chemical tests on wheat and flour.

1.—COMMERCIAL GRAIN AND GRAIN INSPECTION. Junior year, fall term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: Grain Crops.

This course includes a study of methods of handling, storing, marketing, and grading of grain; the history of the origin and development of grain inspection and grades; the classification and organization of inspection systems; the organization and functions of grain exchanges or boards of trade; and principal grain markets, with receipts, shipments, and consumption.

Laboratory.—Actual practice in grading samples, determining dockage, and studying the kinds of damage in commercial grains, with relation to their effect on market value.

2.—GRAIN PRODUCTS. Junior year, winter term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: Commercial Grain and Grain Inspection.

A brief study of the methods of manufacturing food products from cereals, with the resulting by-products, and a comparison of composition and feeding value of these by-products.

Laboratory.—Study of actual samples of most important cereal food products and by-products.

3.—EXPERIMENTAL MILLING. Junior year, spring term. Laboratory, four hours. Two credits. Prerequisite: Grain Products.

This course includes a study of the theory and practice of milling, with demonstrations on a small experimental mill.

4.—ADVANCED EXPERIMENTAL MILLING I. Senior year, fall term. Laboratory, eight hours. Four credits. Prerequisite: Experimental Milling I.

This course consists of practice in the art of milling, with demonstrations on model mill.

5.—WHEAT AND FLOUR TESTING. Senior year, winter term. Class work, one hour; laboratory, six hours. Four credits. Prerequisites: Grain Products, and six credit hours of Quantitative Analysis.

This course includes special quantitative tests applied to cereals and their by-products; methods for analysis and interpretation of results.

6.—EXPERIMENTAL BAKING TESTS. Senior year, spring term. Laboratory, eight hours. Four credits. Prerequisite: Wheat and Flour Testing.

This course includes practice in baking tests; comparison of methods, formulas, and flour; and, interpretation of results.

7.—MILLING PRACTICE. Senior year, spring term. Laboratory, eight hours. Four credits. Prerequisite: Advanced Experimental Milling.

This course is a continuation of Advanced Experimental Milling.

Poultry Husbandry

Professor LIPPINCOTT.
Superintendent HARRIS.

The poultry plant is situated on a gentle south slope just north of the new Agricultural Building. The plant occupies eight acres, and is devoted to the breeding and rearing of the stock used for class work. It is equipped with different types of incubators, brooders, houses and runs, and with flocks of the leading breeds of fowls.

There is in the government and state experiment stations, and in schools and colleges, an increasing demand for men with experience and systematic training in poultry. There is likewise a growing demand for men capable of managing poultry farming enterprises of considerable proportions, or of entering the commercial branches of the work.

COURSES IN POULTRY HUSBANDRY

1.—POULTRY MANAGEMENT. Freshman year, winter term. Lectures, two hours. Two credits. Required in the course in veterinary medicine.

This course takes up the general problems of poultry practice, and pays particular attention to the relation of these problems to the maintenance of health.

2.—FARM POULTRY PRODUCTION. Junior year, spring term. Class work, two hours; laboratory, two hours. Three credits. Required in the agricultural courses and in the course in industrial journalism; elective in the course in general science.

This course takes up the problems of poultry management on the general farm. The subjects of feeding, breeding, incubating, brooding and marketing are studied.

3.—PRACTICE IN POULTRY FEEDING. Elective, spring term. Three times a day, seven days a week, for a period of four weeks, at hours outside the regular schedule. One credit.

This course consists of the actual care of a flock of fowls by the student, under supervision of an instructor. Careful record is kept of the feeds used and the eggs produced. A financial statement is required at the end of the feeding period.

4.—PRACTICE IN INCUBATION. Elective, spring term. Three times a day, seven days a week, for a period of four weeks. One credit.

This course consists in the care of an incubator by the student through the incubation period, testing the eggs, and bringing off the hatch. Careful records of fertility, cost of incubation, etc., are kept.

5.—PRACTICE IN BROODING. Elective, spring term. Three times a day, seven days a week, for a period of four weeks, at hours outside the regular schedule. One credit.

In this course each student handles a flock of chicks. He has the entire care of brooding and feeding them during the four most critical weeks. A report of cost of fuel and feed, of gain in weight, and of mortality, is required. This course must be preceded or accompanied by Practice in Incubation.

6.—PRACTICE IN CANDLING. Elective, fall term. Laboratory, two hours. One credit.

This course consists in making a first-hand study of the commercial grades of eggs. Particular attention is given to those forms of deteriora-

tion found in Kansas, including blood rings, spots, heats, and green whites, which are likely to be overlooked by egg buyers. A study is also made of the relative deterioration of fertile and infertile eggs.

7.—PRACTICE IN CAPONIZING AND DRESSING. Elective, fall term. Laboratory, two hours. One credit.

In this course work is given in caponizing and killing, bleeding, packing, cooling, shaping, and grading poultry for market.

8.—BREEDS AND BREED TYPES. Elective, fall term. Class work, one hour; laboratory, four hours. Three credits.

In this course a historical study is made of the various breeds commonly found on Kansas farms. Particular attention is paid to tracing the evolution of the present breed types. The laboratory is given over largely to judging the different breeds and varieties both by score card and by comparison.

9.—ADVANCED JUDGING. Elective, winter term. Laboratory, four hours. Two credits. Prerequisite: Breeds and Breed Types.

This course is a continuation of Breeds and Breed Types, giving further practice in judging the more common varieties, and taking up some of the rarer breeds.

General Agricultural Course

Dean MILLER.

1.—AGRICULTURAL EXTENSION. Elective, spring term. Class work, two hours; laboratory, two hours. Three credits. Elective for seniors in the course in agriculture.

This is a brief course which considers the agricultural needs and conditions of the State, and methods to be employed to meet them; the organizations now existing or to be organized. In this course are studied the methods employed in other states and countries to meet special conditions peculiar to different climates and civilizations.

Veterinary Medicine

Professor SCHENLEBER.
Assistant Professor GOSS.
Assistant Professor BURT.
Assistant Professor DYKSTRA.
Instructor ROGERS.
Assistant HASLAM.
Assistant GINGERY.
Assistant FRANKLIN.
Assistant _____.

The Department of Veterinary Medicine gives most of the technical work in the course in veterinary medicine, a general description of which is given elsewhere. The department is housed in the Veterinary Building, which was erected at a cost of over \$60,000 and is thoroughly equipped throughout. It contains modern classrooms, and its laboratories possess the necessary appliances for illustrating the several subjects required. The mode of instruction is more specifically detailed in succeeding sections.

The courses in anatomy require several lecture rooms, which contain models, skeletons, and bones of all kinds, and a thoroughly sanitary dissecting room equipped with all of the latest materials necessary to give a

course in anatomy second to none on the continent. The dissecting materials are furnished by the department free of charge.

For work in histology and pathology the department is exceedingly well provided. It has over thirty large microscopes, equipped with both high and low power, and several oil immersion objectives, microtomes, the best reflectoscope and projectoscope obtainable, besides a large assortment of histological and pathological slides, materials, and specimens for use in demonstration work in class and laboratory.

The equipment for instruction in physiology is ample to give the student a thoroughly comprehensive course of laboratory study.

For the study of *materia medica* and *pharmacy* there is a general *pharmacy* laboratory containing all the drugs used in the practice of *veterinary medicine*, and a practicing *pharmacy* where medicines are compounded for the every-day practice connected with the College.

For instruction in *surgery* and *clinic* the equipment is excellent. The *surgical amphitheater* is an annex to the main *Veterinary Building*, seating over three hundred people, and equipped with every modern appliance for performing before the classes the most delicate operations upon both large and small animals. The *hospital* has a capacity of about thirty animals and is nearly always filled with patients, which gives ample material for the study of *internal medicine* as well. The *out-clinic* furnishes several thousand cases yearly, giving the student opportunity to become familiar with the diseases and their treatment under the guidance of proficient practitioners.

The policy adhered to in the instruction in all the departments is that the science of *veterinary medicine* is the foundation, and the art merely supplementary. A thorough drill is given in the foundation studies, and later in the course practical application of these is made in actual field work. This results in a thoroughly scientific *veterinary education*.

COURSES IN ANATOMY

A few years ago there was inaugurated an entirely different method of anatomical instruction, hitherto untried in any school of human or *veterinary medicine*, and its success was so marked that it has become a permanent feature of the teaching of the department. Anatomy I, including dissection, takes up the bones of the trunk, *i. e.*, the *vertebræ*, ribs, sternum, and pelvis. The ligaments which hold these bones together are next considered, and are followed immediately by a study of the muscles of the trunk, which inclose the abdominal and thoracic cavities. The student is now ready to fill in and locate properly, and to study thoroughly, the important organs in these two body cavities. This work is immediately followed by the study of the blood supply of these organs, and this in turn by the study of the nerve supply controlling them, including that of the spinal cord, the vessels and nerves being carried to their point of exit from the trunk.

After the completion of Anatomy I of this course, the student has actually seen and dissected every essential organ in its gross anatomy, and to some extent in its microscopic. He is now thoroughly prepared

for the study of histology, after which follows physiology, or the functional study of organs, and the detail of their cell structure.

The limbs, the main functions of which are locomotion, are, together with the head and neck, usually in need of surgical rather than of medicinal treatment in veterinary practice. The practitioner, therefore, requires an extremely accurate knowledge of these parts, and when this anatomical study is brought closer in point of time to the study of surgery concerned, its practical application emphasizes the essential facts most effectively. By mutual consent, the dissection by one class occurs every morning at seven o'clock, thus giving higher classmen who desire to specialize in anatomy an opportunity to review the work, and to demonstrate by working with and by assisting the under classmen.

Before dissecting the ligaments and muscles of any part, the student is required to study them upon a mounted skeleton, thus ascertaining the exact points at which they attach to the bones. He then goes over the same muscles and ligaments on the Azoux model, afterwards dissecting them and proving the facts already learned, thereby acquiring a perfect mental picture of the animal body.

In Anatomy I, II, III, and IV, each student is required to pass one perfect examination upon the origins and insertions of all the equine muscles of the part dissected, and he is marked, not upon the degree of perfection of the examination, but upon whether perfection was accomplished in the first, second, third, or fourth trial. He must also give a satisfactory tree outline of the circulatory and nervous systems, showing their distribution and branches, and their relationships. A satisfactory knowledge of the nerve supply of each muscle and of each cutaneous area is required.

In the winter term of the freshman year the class is divided into two equal sections, one half studying the anterior limb, in Anatomy II, and the other half studying the posterior limb, in Anatomy III, while the reverse arrangement is followed in the spring term.

The dissecting room is situated in the basement of the Veterinary Building, and possesses the best of sanitary and other equipment. The instruction in the classroom consists of quizzes, recitations, special dissections of the part under discussion, and a study of the Azoux model of the horse. Mounted skeletons and limbs and loose bones are abundant in the museum.

The subjects for dissection are preserved by the injection of a formaldehyde solution, followed by a red-starch solution that hardens within and fills the arteries. The veins are similarly treated with a bluish medium. The subjects are further preserved by immersion in a large concrete tank containing 15,000 pounds of solution specially prepared for this purpose. McFadgean's *Osteology and Anatomy of the Horse* is required in Anatomy I, II, III, and IV; Sisson's *Veterinary Anatomy* is required in addition in Anatomy V and VI, but those students who can afford it are urged to purchase both at the beginning of the course.

1.—ANATOMY I. Freshman year, fall term. Class work, one hour; dissection, eleven hours. Six and one-half credits. Required in the course in veterinary medicine; elective in other courses.

The course consists of supplemental lectures, demonstrations, and quizzes upon the bones, ligaments, and muscles; splanchnology, angiology, and neurology of the trunk, including the introductory work to each of these divisions of systematic anatomy. Textbook, *Osteology and Anatomy of the Horse*, by McFadgean.

2.—ANATOMY II. Freshman year, winter term. Class work, one hour; dissection, eleven hours. Six and one-half credits. Required in the course in veterinary medicine; elective in other courses.

The course deals first with the osteology, then with the musculature of the head and neck, after which are considered the angiology and the neurology of these parts, including the brain.

Dissection.—The course includes a very thorough laboratory study of the bones of the head, collectively and individually, special reference being given to the teeth, sinuses, cavities, and foramina. The cephalic muscles, the pharynx, the guttural pouches, the ear, the eye and the tongue are then dissected, together with the brain.

3.—ANATOMY III. Freshman year, spring term. Class work, one hour; dissection, six hours. Four credits. Required in the course in veterinary medicine; elective in other courses.

This comprises a review of Anatomy I, and lectures, demonstrations and quizzes upon the bones, ligaments, myology, neurology and angiology of the anterior limb, including the foot, with the exception of the digital vessels.

4.—ANATOMY IV. Sophomore year, fall term. Class work, one hour; dissection, six hours. Four credits. Required in the course in veterinary medicine; elective in other courses.

Both the class work and the dissection deal with the posterior limb in a manner exactly similar to the method employed in Anatomy II, but includes the study of the circulation of the foot.

5.—ANATOMY V. Sophomore year, winter term. Class work, one hour; dissection, six hours. Four credits. Required in the course in veterinary medicine. Prerequisites: Anatomy I, II, III, and IV.

A correlative review of the entire subject is given, taking successively the bones, the ligaments, the muscles, the viscera, the blood vessels and the nerves in their entirety, and in the order here specified. The locomotor, respiratory, digestive, urinary and reproductive systems are then dealt with in such a manner as to build up a mental image of each structure in the student's mind.

Dissection.—In the dissecting room each division of systematic anatomy is taken up as a whole, each subject for dissection being preceded by regional and flap dissections of the principal operative areas, and by the isolation of the structures to be operated upon. The work also includes a mapping out in crayon of the important structures beneath the skin of a dark-colored horse. Textbook, *Veterinary Anatomy*, by Sisson.

6.—ANATOMY VI. Sophomore year, spring term. Class work, one hour; dissection, four hours. Three credits. Required in the course in veterinary medicine.

This course consists of a comparative study, accompanied by work in dissection, of the principal structural differences in the ox, sheep, hog, dog, and chicken, upon the basis of the facts learned concerning the horse in Anatomy I, II, III, IV, and V, which are prerequisites.

7.—ANATOMY. Sophomore year, fall term. Ten hours laboratory. Five credits. Required fall term, sophomore, agricultural courses.

The course is planned to give the agricultural students a general idea of the anatomy of farm animals, together with comparative references to many structures of the human body that are usually omitted in their general education. The course aims to aid them in understanding conformation by means of the study and dissection of the structures beneath the skin that modify it, at the same time observing the muscles of locomotion and the various levers, both as regards speed and power or draughting. Special attention is given to a thorough study of the foot, to enable the student to understand its care and shoeing. Considerable time is given to the digestive organs, to give the student a clear conception of the known physiologico-anatomical phases of feeding, digestion, nutrition, and metabolism. Text and laboratory guide, *Osteology and Anatomy of the Horse*, by McFadgean.

COURSES IN HISTOLOGY

Doctor Goss.

Lectures and recitations cover the work, which is done in the laboratory. During the lectures the projectoscope is used to illustrate the tissues studied. It is essential that the student obtain a thorough knowledge of the manipulation of the microscope, of the microscopical structure of the normal animal tissues, and of the methods of fixing, embedding, sectioning, staining and mounting tissues. This work gives the foundation for the study of pathological histology. Each student must prepare a full set of slides, from which he makes high- and low-power drawings for future use.

8.—HISTOLOGY I. Freshman year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine, elective in the course in general science. Prerequisite: Anatomy I.

The first part of the term is spent upon the care and manipulation of the microscope, in the use of which the student must become proficient. This is followed by a microscopical examination of cotton, woolen, silk and linen fibers, bubbles of air, and drops of oil, to enable the student to recognize these when they are accidentally mounted with the tissue. The fundamental tissues are next studied: epithelial tissue with regard to form, structure, arrangement and location; connective tissue with regard to structure and location, including bone development and teeth and their development; muscular tissue, voluntary, involuntary, and cardiac; nerve tissue, the structures and forms of its cells, of medullated and nonmedullated nerve fibers; spinal cord; the blood vessels, heart, and lymphatic vessels. Blood corpuscles are studied with regard to size, shape, and structure, including each kind of white corpuscles; and the method of detecting blood by examination for haemin crystals is shown. In this term the student studies and mounts sixty-five slides, some of which are teased, and many of which are sectioned in paraffin and celloidin. Textbook, *Histology*, by Stohr.

9.—HISTOLOGY II. Freshman year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine; elective in the course in general science.

This is a continuation of Histology I, beginning with the blood-forming organs, as bone-marrow, lymph glands, and spleen. The histology of the digestive tract is next studied, including a study of the mouth, the tongue, the taste buds, the parotid, the submaxillary and sublingual, the thyroid and thymus glands; the esophagus; the stomachs of the dog, the horse and the ox; the small intestines—duodenum, jejunum, and

ileum; the large intestines—cæcum, colon, rectum, and anus. During this term the student stains, mounts, studies with the microscope and makes drawings of the above-mentioned tissues. Some of the tissues studied are injected with gelatin mass to bring out the blood vessels. Textbook, *Histology*, by Stohr.

10.—**HISTOLOGY III.** Sophomore year, fall term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in veterinary medicine; elective in the course in general science.

This is a continuation of Histology II, and includes the microscopic study of the liver, the pancreas, the respiratory tract—nasal mucous membrane, larynx, trachea, lungs, and bronchi; the urinary organs—kidney, ureter, bladder, urethra; the male and female genital organs; the skin and its appendages; the suprarenal gland; the medulla; the cerebellum; the cerebrum; the eye; and the ear. In this course the student prepares thirty slides. Textbook, *Histology*, by Stohr.

COURSES IN PHYSIOLOGY

The courses in physiology are divided into Comparative Physiology, Animal Physiology and Human Physiology.

11.—**COMPARATIVE PHYSIOLOGY I.** Sophomore year, winter term. Class work, five hours; laboratory, four hours. Seven credits. Required in the course of veterinary medicine; elective in the course in general science. Prerequisites: Anatomy I; Chemistry I, II, III; Organic Histology I and II.

This course treats of the physiology of domestic animals, beginning with the study of the blood, heart, blood vessels, and continuing with the ductless glands and internal secretions, respiration, digestion, and absorption. Textbook, *A Manual of Veterinary Physiology*, by Fred Smith.

Laboratory.—The laboratory work consists of a practical application of the knowledge derived in the classroom. The laboratory is equipped with all necessary material and apparatus to make a detailed study of the composition and digestive action of the saliva, gastric juice, bile, pancreatic and intestinal juices. Hormones and other substances in relation to their influence upon the production and action of the digestive juices are also considered. The composition and properties of the blood are studied by the aid of chemical, microscopic and spectroscopic methods. Textbook, Halliburton's *Essentials of Chemical Physiology*.

12.—**COMPARATIVE PHYSIOLOGY II.** Sophomore year, spring term. Class work, five hours; laboratory, four hours. Seven hours credit. Required in the course of veterinary medicine; elective in the course in general science.

The work of this term is a continuation of Comparative Physiology I, and treats of the urine and urinary system, nutrition, animal heat, muscular and nervous symptoms, locomotion, generation and development, growth and decay. Textbook, Smith's *A Manual of Veterinary Physiology*.

Laboratory.—The laboratory work consists of a study of the normal urine, determining the composition, quantitatively as well as qualitatively. Tests for the detection of abnormal constituents, such as bile, blood-sugar and albumen, are applied to normal and also to pathological urine. Microscopic examination is made for blood casts, blood, etc. The laboratory work in practical physiology consists in studying the phenomena associated with the nervous, muscular, respiratory and circulatory systems, and making graphic records of the same. Textbook, *Urine of the Horse and Man*, by Fish; *Practical Physiology*, by Hemmeter.

13.—HUMAN PHYSIOLOGY. Sophomore year, spring term. Class work, four hours. Four credits. Required in the course in home economics; elective in the course in general science. Prerequisites: Chemistry I, II, III; Elementary Organic Chemistry.

The instruction consists of a study of the composition of the bones, blood, lymph, and all the secretions of the body, with their respective functions. The functions of the tissues and glands, the structure and functions of the digestive tract, of the respiratory tract, of the skin, of the nervous system and of the organs of special sense are all considered. The lecture room is equipped with skeletons, papier-mâché manikins, and models of the eye, ear, etc. Demonstrations relative to the subject under discussion are made as often as is practicable. Textbook, Martin's *Human Body*.

14.—CHEMICAL AND EXPERIMENTAL PHYSIOLOGY. Class work, two hours; laboratory, four hours. Four credits. Elective. Prerequisite: Human or Animal Physiology.

This course is intended to supplement the lectures in physiology, so that the student will make a practical application of the knowledge obtained in the classroom. It will embrace the study of the composition of the body tissues and the secretions and excretions of the various glands; the various enzymes and their physiological relation to the digestion of the food substances; absorption, assimilation, and metabolism. The composition and properties of the blood will be studied by spectroscopic, microscopic and chemical methods. Graphic records of the blood pressure and of the pulse, as well as of the phenomena that attend the contraction of muscles, will be made. Textbook, Halliburton's *Essentials of Chemical Physiology*.

15.—ANIMAL PHYSIOLOGY. Sophomore year, winter term. Four hours. Required in the course in agriculture.

This course is intended to give the student a useful knowledge of the functions of the body of the various farm animals, so that he can realize and understand the benefits to be derived from the judicious application of proper breeding, feeding and care of farm stock. The course includes the study of the composition and functions of the various digestive juices and the relation of the food to the production of heat, growth, and maintenance of health. The functions of the blood, respiratory, nervous and excretory systems are also carefully studied. Specimens, charts and various apparatus will be employed to demonstrate the facts presented during the lecture periods. Text, Fred Smith's *Manual of Veterinary Physiology*.

PATHOLOGY

The laboratory is equipped with microscopes, microtomes, paraffin ovens, microphotographic and projection apparatus. Each student is furnished with a microscope, and lockers containing staining dishes and stains. Material is furnished the student for embedding, sectioning and staining tissues for microscopic study. In addition, the student is furnished many mounted slides for study, which contain the pathological lesions to which the domestic animals are subject. In addition to this, the material from the *post mortem* of animals and material sent to the College from over the State furnish ample material for laboratory diagnosis.

16.—PATHOLOGY I. Junior year, fall term. Class work, five hours; laboratory, four hours. Seven credits. Required in the course in veterinary medicine; elective in the course in general science. Prerequisites: Histology, Physiology, and Bacteriology I.

This course in general pathology treats of the history of pathology, predisposition, immunity, congenital and inherited disease; circulatory disturbances—cardiac difficulties, hyperæmia, hemorrhage, dropsy, œdema, thrombosis, embolism, and alteration of the blood; disturbances in me-

tabolism—fever, necrosis, atrophy, cloudy swelling, fatty changes, inflammation, calcification, and concrement formation; and of the process of repair, of tumors, and of functional disturbances. Text, *Comparative General Pathology*, by Kitt.

17.—PATHOLOGY II. Junior year, winter term. Class work, four hours; laboratory, six hours. Four credits. Required in the course in veterinary medicine; elective in the course in general science.

This course is devoted to pathological technique: collecting, fixing, hardening, embedding in celloidin and paraffin, sections of fresh, frozen and embedded tissues; and a study of the method of preserving gross specimens. Considerable time is devoted to stains and the method of staining. This work is followed by special pathology, which includes the macroscopic and microscopic examination of the following tissues in all of the pathological conditions to which they are subject: cardiac muscle, skeletal muscle, the liver, the kidney, the bladder, the pancreas, the lungs, digestive tract, the serous membranes, the vascular system, lymph nodes, the spleen, bone, skin, and genital organs. The students stain, mount, study and make drawings of the above-mentioned tissues. Textbook, *Pathological Histology*, by Gaylord and Aschoff.

18.—PATHOLOGY III. Junior year, spring term. Class work, four hours; laboratory, six hours. Seven credits. Required in the course of veterinary medicine; elective in the course in general science.

This course is devoted to the pathology of the infectious diseases and to laboratory diagnosis. Post-mortem examinations are made on all animals dying in the hospital at the College barns and neighborhood. The students attend and take turn in holding the autopsy. Each student is expected to keep a written report of the pathological changes, also of the microscopic findings. The above work is done under the direction of the pathologist in charge. Text, *Pathology of Infectious Diseases*, by Moore.

19.—MATERIA MEDICA I AND II. Junior year, fall and winter terms. Class work, four hours during the fall term, and two hours during the winter term.

The course includes definitions of terms, modes of action of drugs in general, their method and rapidity of absorption and elimination, physiological and chemical incompatibles, etc. The drugs and medicinal agents are grouped according to their action. The lecturer discusses the origin, physical properties, active constituents and official preparations of the medicinal agents.

20.—THERAPEUTICS I AND II. Junior year, winter and spring terms. Class work, two hours winter term, and four hours spring term. Prerequisites: Materia Medica I and II.

The student is thoroughly drilled in the physiological action of the various drugs, or action on the healthy animal, and the therapeutic action, or action on the diseased animal. A course in toxicology is included in this work, taking up the symptoms and treatment of poisons frequently encountered in veterinary practice. The science of posology, or dosage, is considered of the utmost importance, and a liberal amount of time is devoted to it, taking up the proper dose of the crude drug and its preparation for the horse, cow, dog, cat, and swine. Reference works: Winslow's *Veterinary Materia Medica and Therapeutics*; *United States Dispensatory*; Wood's *Therapeutics, its Principles and Practice*.

21.—PHARMACY. Junior year, fall term. Class work, one hour; laboratory, four hours.

In the lectures the meanings of the various pharmaceutical terms are discussed. Various systems of weights and measures, and the conversion of one system into another, are taught. Official preparations and some

nonofficial ones, their strength and the mode of preparation of each, are studied in regular order. Particular stress is placed upon prescription writing, the student being taught to avoid incompatibilities, to give nouns the proper case ending, and to understand the meanings of certain Latin phrases. In the laboratory work the principles of filtration, percolation, hot-water and sand baths, etc., are taught. The student is required to prepare at least one of each of the following preparations: an infusion, a decoction, tincture, wine, syrup, fluid extract, liniment, emulsion, liquor, aquæ, spirit, bolus, ointment, electuary, and cataplasm. In addition, a thorough course in the compounding of prescriptions is afforded at the clinic, where all medicines are prescribed and compounded by the students, under guidance of the instructor in charge. Reference works: *U. S. Pharmacopœia*; *Maltbie's Practical Pharmacy*; *Remington's Practice of Pharmacy*; *Fish's Exercises in Materia Medica and Pharmacy*.

22.—**SURGERY I.** Junior year, fall term. Class work and laboratory, three hours.

This course includes methods of restraint; asepsis and antisepsis; anaesthesia, both local and general; inoculations, bandaging, massage, controlling hemorrhage; division of tissues and the uniting of wounds; injections of medicines into the subcutaneous tissues, blood stream, trachea, spinal canal.

23.—**SURGERY II.** Junior year, winter term. Class work and laboratory, three hours.

This course is a continuation of Surgery I. Animal dentistry is taken up very thoroughly, in so far as it constitutes an important part of the veterinarian's work. The students have free access to a large number of museum specimens of abnormal teeth. Also, many dental patients are presented at the College hospital for treatment.

24.—**SURGERY III.** Junior year, spring term. Class and laboratory, three hours.

This course considers in regular order the surgical diseases of the head, neck, thorax, abdomen, stomach and bowels, urinary organs, and organs of generation.

25.—**SURGERY IV.** Senior year, fall term. Class and laboratory, three hours.

During this course particular attention is paid to causes, symptoms and treatment of lameness. It considers in detail fractures and their reduction, diseases of joints, tendons and sheaths, muscles and fascia, and surgical diseases of the foot.

26.—**SURGERY V.** Senior year, winter term. Class and laboratory, three hours.

Surgery as taught during this course includes special surgical operations, such as neurectomies, autoplastics, desmotomies, actual cauterization, tenotomies, myotomies, enterectomy and interoanastomosis, and surgery of the eye.

27.—**SURGERY VI.** Senior year, spring term. Class and laboratory, three hours.

This is a continuation of Surgery V. Reference books: *Dollar's Regional Veterinary Surgery*; *Merillat's Veterinary Surgery*, Vols. I, II, and III; *Williams' Surgical Operations*; *Fleming's Operative Veterinary Surgery*, Parts I and II; *White's Restraint of Domestic Animals*.

28.—**OPERATIVE SURGERY I AND II.** This is a laboratory course. Four hours a week, extending throughout the fall and winter terms of the senior year, are devoted to this work.

Old horses are purchased by the department, placed on the operating table, anæsthetized, and over one hundred operations are performed on

the animal. During this work the student is required to observe a careful technique, such as antiseptis, and, in fact, performs the operation as thoroughly and completely as possible. It is a very practical course and fits the student for surgical work in actual practice.

29.—HORSESHOEING. Two hours a week during the fall term of the senior year are devoted to this subject.

The course is taught by means of lectures, recitations and demonstrations, taking up the various divisions in the following order: normal conformation in both limb and foot, the anatomy of these parts, physiological movements and correct normal shoeing. This is followed by a study of the proper shoeing for the correction of wry limbs and feet; diseases of the feet, and the relation of horseshoeing thereto. The course ends with a study of the shoeing of mules and oxen. Throughout the entire course the purpose is to instill in the mind of the student normal shoeing, in order that he may be able to correct abnormalities in the foot and limb in so far as this can be accomplished by shoeing. Reference books: Lungwitz's *Textbook of Horseshoeing*; Dollar's *Handbook of Horseshoeing*.

30.—OBSTETRICS. This branch is taken up both by the laboratory and lecture method; two hours a week of the former and four hours a week of the latter during the fall term of the senior year.

Physiological obstetrics opens the course, during which periods of oestrus and gestation, impregnation, ovulation, eutocia, etc., are discussed. This is followed by pathological obstetrics, devoted to diseases of the new-born and diseases incidental to pregnancy, sterility, dystocia, and surgical obstetrics. The latter phase of the work is greatly assisted by demonstrations, during the laboratory period, on an obstetrical phantom and foetus; in addition, the College farm and surrounding agricultural territory furnish an abundance of actual material. Reference books: Williams' *Veterinary Obstetrics*; Williams' *Surgical and Obstetrical Operations*; De Bruin's *Bovine Obstetrics*; Fleming's *Veterinary Obstetrics*.

31.—CONFORMATION AND SOUNDNESS OF THE HORSE. Two hours a week during the spring term of the senior year are given to this subject.

A lecture course, during which the desirable conformation of the horse, together with a description of all blemishes, defects, unsoundnesses, faults and vices are discussed. During clinics ample opportunity is afforded for demonstration on the living animal. Reference books: Goubaux and Barrier's *Exterior of the Horse*; Captain Hayes' *Points of the Horse*.

32.—DIAGNOSIS. Junior year, fall term. Class work, three hours.

This is a preparatory course to the study of medicine proper. It takes up in detail the different diagnostic methods employed for the detection of disease, including auscultation, percussion, palpation, and inspection, and also treats of the normal and abnormal abdominal and thoracic sounds, and considers in detail the specific examination of the various organs, including diagnostic inoculations as an aid to the detection of disease.

33.—MEDICINE I. Junior year, winter term. Class work, three hours.

A study of the noninfectious diseases of the respiratory organs, taking up in regular order the nasal and accessory cavities, the larynx, bronchi, lungs, and pleura.

34.—MEDICINE II. Junior year, spring term. Class work, three hours.

Devoted to noninfectious diseases of the mouth, salivary glands, oesophagus, stomach and intestines, liver, pancreas, and peritoneum. This is followed by diseases of the urinary organs, of the circulatory organs, and diseases of metabolism.

35.—MEDICINE III. Senior year, fall term. Class work, three hours. This course treats the noninfectious diseases of the nervous system, of the organs of locomotion, and of the skin.

36.—INFECTIOUS DISEASES. Senior year, winter term. Class work, four hours.

In contradistinction to the preceding courses in medicine, the distinctly infectious and contagious diseases of domesticated animals are discussed. The following order is usually adopted: acute general infectious diseases, acute exanthematous infectious diseases, acute infectious diseases with localization in certain organs, infectious diseases with special involvement of the nervous system, chronic infectious diseases, infectious diseases produced by protozoa.

37.—SANITARY MEDICINE. Senior year, spring term. Class work, four hours.

A continuation of the course in infectious diseases, in which particular attention is given to propagation and spread of infectious diseases, predisposing and exciting causes of disease, general sanitation, etc.

38.—OPHTHALMOLOGY. It discusses the method of conducting examinations of the eye by means of the ophthalmoscope, illumination of the eye, and the use of drugs as an aid to this process; and acute and chronic diseases of the eye.

Reference books for the courses in medicine: Hutyra and Marek's *Pathology of the Diseases of Domestic Animals*, Vols. I and II; Friedberger and Frohner's *Veterinary Pathology*, Vols. I and II; Law's *Veterinary Medicine*, Vols. I, II, III, IV, and V; Moussu and Dollar's *Diseases of Cattle*; Class' *Diseases of the Dog*; Cadiot's *Clinical Veterinary Medicine*.

39.—JURISPRUDENCE. Senior year, spring term. Class work, two hours.

This course deals with the veterinarian's legal responsibilities, national and state live-stock laws, quarantine regulations, etc.

40.—CLINICS. Drs. Schoenleber, Dykstra, and Burt. Junior and senior years, twelve hours or more.

A free clinic which affords an abundance of material is conducted. All species of domesticated animals are presented for treatment. These patients are assigned in regular order to the senior students for diagnosis and treatment; clinic sheets are provided, on which are recorded the history, symptoms, pulse, temperature, respiration, diagnosis, prognosis, treatment, and the unsoundnesses, defects or blemishes of the animal. The clinician in charge discusses all the abnormal conditions present in the patient, thus assisting the student to develop his powers of observation. The junior students assist the senior students and, in addition, are required to master, by practical experience, the restraint of animals, bandaging, etc. The compounding of prescriptions, the preparation of antiseptics and other medicinal agents, is taken in charge by the junior students.

Patients left at the hospital for treatment are assigned to seniors, who are required to administer all medicines, change dressings of surgical wounds, etc. All work is performed under the direct supervision of the clinician in charge. Numerous country calls are received by the veterinary department, which are taken care of by one of the clinicians, and who is always accompanied by one or more senior students. This phase of the work is particularly valuable, as it gives the student practical experience under actual conditions.

41.—MEAT INSPECTION. Senior year, spring term. Class work, four hours. Four credits. Required in the course in veterinary medicine.

The course in meat inspection is designed to prepare experts for

national, state and local sanitary work, which is being more strongly urged and demanded every day. The kinds and classes of stock, the traffic and transportation of animals, their inspection before death, their slaughter, the normal conditions of healthy animals, the diseases discernible at the time of slaughter, the disposition of the condemned from economic, hygienic and sanitary standpoints, and different preparations and methods of preservation, adulterations, sanitary laws and regulations, and all other points bearing upon the question of healthful meat production, are considered. Visits are made to the local slaughtering establishments, and to the large packing plants in Topeka, Kansas City, or Wichita. Text, Edelman's *Meat Hygiene*, translated by Mohler and Eichorn.

42.—DISEASES OF FARM ANIMALS, AND OBSTETRICS. Senior year, spring term. Class work, four hours. Four credits. Required in the courses in animal husbandry and dairy husbandry. Prerequisites: General Anatomy I and Animal Physiology.

This course is devoted to the study of the common diseases of farm animals and to obstetrics. The subjects discussed include wounds and their treatment, examining farm animals for disease, the diagnosis and treatment of disease, the causes and treatment of contagious diseases. Sanitary and other measures necessary for their eradication and prevention are also studied. The instruction in obstetrics embraces a comparison of the soft and bony structures of the pelvis in the different animals, the comparison being made with reference to normal and difficult parturition. The causes of sterility are discussed, and the necessary remedies suggested. Attention is given to the accidents and diseases incidental to normal and difficult parturition. The diseases following parturition and the diseases affecting the offspring are also dealt with. Text, *The Farmer's Veterinarian*, by Burkett.

Short Winter Courses in Agriculture and Dairying

The Agricultural College offers primarily four-year courses in agriculture, which give the student a fundamental training in the sciences relating to agriculture, and their application to the production of crops and stock and to farming in general. Such a course not only equips a man to become a successful farmer, but makes of him a better citizen, and a leader in the broader duties of life.

Not all young men who choose to farm have the time or the means to spend the necessary four years in getting a college training. For such who are at least eighteen years of age, the Agricultural College offers a short, practical course in agriculture and dairying, given in two terms. The entire time of the student is occupied in learning how to do the various things which are necessary for the production of good crops and good stock, and for the business management of the farm. The subjects taught in such a course cover as much as can be given in the time, and are made intensely practical in presentation. The student is taught *why* and *how* to do the various farm operations.

DESCRIPTION OF SHORT COURSES

AGRICULTURE AND DAIRYING

The student may select either agriculture or dairying, or a combination of the two, as may best suit his individual needs. All students are required to take crop production, live-stock production, poultry, and wood-work the first year, and breeding and feeding of live stock, live-stock sanitation, agricultural botany, soil physics, and blacksmithing the second year. Other subjects offered are elective, enough being taken to make up a full course of fifteen hours of class work and twenty-eight hours of laboratory work a week.

The work in crop production and live-stock production gives a knowledge of these subjects in a practical way. The student who has not taken scientific work is not able to study them from the standpoint of one trained in chemistry, physics, zoölogy, etc., but can get from his study in class and laboratory the art of doing these things properly. The same is true of dairying and horticulture. The farmer needs to know how to select stock and crops that will be best adapted to his environment, and the short courses train him to do this. He needs to know how to prepare his soil for the reception of the seed; or so to manage his feed as to make the greatest gains in feeding his live stock. These things are taught successfully to short-course students.

Farm mechanics, as it relates to general farming or dairying and to practice in woodwork, is taught in such a way as to make the student capable of handling tools and machinery with proper skill.

The students who return for the second winter's work are given more advanced work along the same lines that were studied the first year.

The problems of breeding and feeding, diseases of live stock, soil and crop management, and the building up of pure-bred herds, are studied from the standpoints of the purchaser, the breeder, and the farmer.

Farmers' Short Course

The Arabic numeral following the name of a subject indicates the number of credits, and the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FIRST YEAR.	SECOND YEAR.	SECOND YEAR (CONT'D.).
Crop Production 6 (4-4)	Animal Breeding 3 (3-0)	Dairying II 4 (4-0) or
Live Stock Market Classes 3 (1-4)	Breeds 3 (1-4)	Horticulture 3 (3-0)
Live Stock Feeding 3 (3-0)	Farm Management 2 (2-0)	Farm Insects 2 (2-0)
Horticulture and Forestry 6 (4-4) or	Live Stock Sanitation 3 (3-0) or 3 (1-4)	Blacksmithing 2 (0-4)
Dairying I and Poultry 6 (4-4)	Gas Engines 3 (1-4)	Dairy Stock Judging 2 (0-4) or
Farm Machinery 1 (0-2)	Crop Improvement 5 (3-4)	Horticulture Lab. 2 (0-4)
Woodwork 2 (0-4)	Agricultural Botany 2 (0-4)	
	Soils 2 (0-4)	

Creamery Course

This course is offered for young men who wish to become butter or cheese makers or handlers of market milk and ice cream. It is a technical course, offered to those who have had experience in creamery or other dairy work, or to those who have taken the dairy farming course. Certificates are issued to students who have completed the course in a satisfactory manner and have a report of six months' successful work in a factory. The subjects taught are as follows:

Creamery Management 4 (4-0)	Dairy Mechanics and Refrigeration 4 (2-4)
Creamery Butter Making 6 (2-8)	Judging Dairy Products 4 (4-0)
Cheese and Ice-cream Making 4 (1-6)	Dairying 6 (4-4)

SUBJECTS TAUGHT IN THE SHORT COURSES

AGRONOMY

1.—CROP PRODUCTION. Class work, four hours; laboratory, four hours. Six credits. Required in the first year of the farmers' short course.

In this course such questions as time, depth, and manner of plowing; seed-bed preparation; time, rate, and method of seeding the various crops; crop rotation and cultivation, and farm soils are taken up in turn and discussed in a practical way.

Laboratory.—Special attention is given to the grain crops grown in this State. Various types of different varieties of corn, wheat, oats, etc., are available for comparative study. The student has the opportunity to handle and examine specimens of the common crops of this State—the best possible method for becoming familiar with the different plants.

2.—FARM MECHANICS. Laboratory, two hours. One credit.

This is a new but very important line of work. There is probably a greater waste on farms from lack of knowledge of the kind of machinery to use, and of the way to care for it, than from any other cause. Mechanics in some form is required in practically every operation performed on the farm. The purpose of this course is to acquaint the student with the important improvements in farm machinery and to give him a general idea of the proper care, adjustment, and use of all farm equipments, as well as a general idea of the factors concerned in the construction of farm buildings, etc. This work is given in the form of illustrated lectures and laboratory demonstrations.

3.—CROP IMPROVEMENT. Class work, three hours; laboratory, four hours. Five credits.

The object of this course is to present practical, up-to-date, and approved methods of improving farm crops. Such questions as seed selection, crop adaptation, and crop rotation are presented and discussed in a practical manner.

4.—SOILS. Laboratory, four hours. Two credits. Required in the second year of the short course.

This course consists of a study of methods of handling soils; it teaches how to prepare a suitable seed-bed, how to conserve moisture, and how to maintain fertility. A part of the period is used for lectures and demonstration.

5.—FARM MANAGEMENT. Class work, two hours. Two credits.

The object of this course is to assist the student in applying to the management of a farm the information gained from his studies in the

various agricultural courses. The work in animal husbandry, dairying, horticulture, agronomy, and other lines is correlated and placed on a practicable, workable basis, with all nonessential features eliminated. The farm lay-out is studied with especial reference to the character of the soil, its adaptation to certain kinds of crops and types of farming; the location of the buildings, their adaptation to types of farming; the proper distribution of capital among land, buildings, live stock, farm machinery, etc.; the division of the farm into fields of the proper size and shape for economical working; the planning and utilization of crops in rotation with one another; the relation of live stock to the maintenance of soil fertility; the proper adjustment of labor, teams, machinery, etc., to the farming area; and the growing of the right kind of crops in the proper proportion on farms of different types.

HORTICULTURE

1.—HORTICULTURE AND FORESTRY. Class work, four hours; laboratory, four hours. Six credits.

Lectures are given on the principles upon which successful work in gardening and fruit growing depends. Here is given a discussion of the preparation of the soil, the use of fertilizers, the propagation and manipulation of plants, and the gathering and marketing of garden and orchard products. The twelve lectures on forestry here included cover in detail the formation of windbreaks and farm wood-lots, discuss the trees suitable for planting in the different parts of the State, and describe methods of planting and the care and cultivation required for securing successful growth.

Laboratory.—Two periods are used in investigating plant propagation, plant training, and plant protection. The other two periods are spent in inspecting the forest nursery and timber plantations.

2.—HORTICULTURE. Class work, three hours. Three credits.

The work of this course is somewhat similar to the horticultural work described in the preceding course. A short discussion of the landscape principles and materials concerned in the improvement of farm properties is included.

3.—HORTICULTURE LABORATORY. Four hours. Two credits.

This includes a study of orchard sites, and of grades of nursery stock and its care; tests of orchard tools, of fuels and heaters for frost protection; a study of orchard sanitation, fruit picking, packing, judging, and storage.

ANIMAL HUSBANDRY

1.—LIVE STOCK MARKET CLASSES. Class work, one hour; laboratory, four hours. Three credits.

One lecture a week is given on the various market classes of live stock, taking up the study of the various market requirements for producing fat as well as for feeding cattle, the different types and classes of horses, sheep, and hogs. The aim of this work is to make the student familiar with the classifications found in the leading live-stock markets, and to enable him better to judge the various breeds of stock on the farm.

Laboratory.—The principal work is the judging of cattle, sheep, and hogs. The student is first taught the use of the score-card, and, after becoming familiar with this, is required to use comparison and group judging, the aim being to make him familiar with the best types of horses, and able both to detect unsoundness and to select such classes of stock as will give the best returns. During the last two weeks of the course the instruction in stock judging takes up dairy cattle. This is an elementary course in dairy-stock judging, and consists of scoring and judging animals by the use of score cards.

2.—LIVE STOCK FEEDING. Class work, three hours. Three credits.

This is a study of all the common feedstuffs grown on the average farm, of the use of mill feeds and by-products, of the combinations of feeds that will give the best results, and of the feeds that can be most economically used under various conditions.

3.—ANIMAL BREEDING. Class work, three hours. Three credits.

This subject is intended to give the student a knowledge of underlying principles and practices which are concerned in the improvement of our domestic animals. A careful study is made of the subject of variation in general. The subject of transmission of characters and the behavior of the various characters in transmission is taken up. The subject also includes correlation, type, and variability. Study is made of Mendel's law of hybrids. Prepotency of animals is studied as an influence in heredity. Practical problems involving the selection of animals and various systems of breeding, such as crossing, hybridizing, grading, line breeding, and inbreeding, are discussed. The student is shown how to maintain and to improve his own flocks and herds by the application of these various fundamental principles of breeding.

4.—BREEDS. Class work, one hour; laboratory, four hours. Three credits.

A study is made of the origin and history of the various breeds of domestic animals, of the characteristics of each breed, and of their adaptability to various conditions.

Laboratory.—This work consists in the judging of pure-bred classes of stock. The characteristics of each breed, its weaknesses and its strong points, are emphasized, in order that the student may be better able to select his breeding herd. During the last two weeks of the course in breeds of live stock, the principal breeds of dairy cattle are studied, and types of each breed are judged and scored. For those students who elect dairying, or who desire to take more work in judging and studying dairy breeds, a special course is offered. In this course is given the history of breeds, their dairy characteristics, with the study of advanced registry systems and pedigree work with each breed.

5.—LIVE STOCK SANITATION. Class work, three hours. Three credits.

This subject deals with diseases that are communicable from animal to animal or from animal to man. The causes, symptoms, and methods that are employed to prevent and to combat the spread of diseases, and the drugs that are commonly used as disinfectants, for washes, dips, etc., are given full consideration. The use of serums, vaccines, etc., for the prevention of diseases is considered. Methods of disposal of sick and dead animals, as well as the means employed to clean and to disinfect the premises so as to prevent a recurrence of diseases, are considered.

DAIRY HUSBANDRY

1.—DAIRYING I. Class work, four hours; laboratory, four hours. Six credits.

This is a general course in dairying, and consists of lectures on the secretion, composition, and properties of milk; the effect of the period of lactation; the Babcock test; the farm separator; farm butter making; and dairy sanitation. Lectures describe the handling of milk, feeding the dairy cow, and selecting and breeding the dairy herd.

Laboratory.—The laboratory work in this course consists of the operation of the Babcock test with milk, skimmed milk, cream, etc.; of practice with farm separators; and of farm butter making.

2.—DAIRYING II. Class work, four hours. Four credits.

This course is planned for those students who elect dairying during the second year. Instruction is given in keeping records and accounts of

dairy-farm business; in building up a dairy herd; concerning buildings on a dairy farm; concerning silos and silage; on the fertility account of the dairy; on the feeding, care, and management of the dairy herd; on cow-testing associations, the coöperative ownership of dairy sires, and the making of detailed plans for the management of the dairy farm.

3.—DAIRY STOCK JUDGING. Laboratory, four hours. Two credits.

This course deals with judging dairy cattle from the standpoint of breed type. Practice is given in scoring animals with the breed score-cards, with comparative judging of the principal breeds.

4.—CREAMERY MANAGEMENT. Class work, four hours. Four credits.

This course is a study of the location, construction, equipment, and general arrangement of the creamery; of the organization of coöperative creameries, etc.; of the question of supplies for the creamery markets; of the keeping of accounts; of the making up of pay rolls and systems of payment; of the building up of cream routes; of the relation of creamery and buyers to the patrons; of the relation of patrons to the creamery.

5.—CREAMERY BUTTER MAKING. Class work, two hours; laboratory, eight hours. Six credits.

Lectures are given on the sampling, weighing, and grading of cream and milk; on natural and commercial starters; on the pasteurization of milk and cream; on cream ripening, and the churning, washing, salting, packing, and marketing of butter; on conditions controlling the per cent of moisture in butter, etc.

Laboratory.—The laboratory work comprises practice in sampling, weighing, and grading milk and cream and in churning, packing, and marketing butter; the study of different makes of churning; the pasteurization of cream and practice with starters.

6.—CHEESE AND ICE-CREAM MAKING. Class work, one hour; laboratory, six hours. Four credits.

This course deals with the making of cheese on the farm for home use and for sale. All the common types of cheese are made. The last half of the term is devoted to the study of ice-cream making, including proportion of cream, flavoring, fillers, freezing, packing, and storing ice cream.

Laboratory.—Practice is given in the making of cheese, ice cream, and ices, for home use and on a commercial scale. The student judges cheese and prepares cream; flavors, freezes, and packs ice cream.

7.—DAIRY MECHANICS AND REFRIGERATION. Class work, two hours; laboratory, four hours. Four credits. Required in the creamery course. This course deals with the machinery and equipment of creameries, cheese factories, milk stations, and ice-cream factories, and with the buildings used for work of this character.

Laboratory.—Practice work is given in pipe fitting, belt lacing, the adjustment of pulleys, soldering, refrigeration, installation and management of machinery, etc.

8.—JUDGING DAIRY PRODUCTS. Laboratory, four hours. Two credits.

The work comprises scoring and judging butter, cheese, milk, and ice cream.

ADDITIONAL COURSES

1.—POULTRY. Laboratory, two hours. One credit.

The first part of the course is devoted to a study of farm poultry. The subjects—breeding, feeding, fattening, and marketing poultry; hatching and rearing chicks; construction of poultry houses; and methods of combating disease—are taken up in detail. The remainder of the time is given to a study of the different breeds from the fancy and from the utility standpoints.

2.—WOODWORK. Shop work, four hours. Two credits.

A graded set of problems in joinery is given, with opportunity for practice in working to dimensions and in the proper use and care of bench tools. Tool required: a two-foot pocket folding rule.

3.—BLACKSMITHING. Shop work, four hours. Two credits.

This is a course in the forging of iron, designed to teach the operations of drawing, upsetting, welding, twisting, splitting, and punching. A study is made of the construction, care, and management of the forge, with a study of the smelting of iron ore and the manufacturing of iron and steel. Tools required: a two-foot rule; one pair of five-inch outside calipers.

4.—AGRICULTURAL BOTANY. Laboratory, four hours. Two credits.

This is a study of the elements of botany from a practical standpoint. Germination, growth, the nutrition of plants, the absorption and use of water, etc., are demonstrated by means of elementary experiments. The groups of the lower plants are rapidly surveyed, especial attention being paid to the fungi causing plant diseases. Chief attention is given to the botany of the higher plants, notably those most important in agriculture. The economic relations of plants are emphasized throughout, and the practical bearings of plant physiology on agriculture are especially considered. Some time is given to the matter of seed testing, and to the study of elementary methods in plant breeding. Text, Perceval's *Agricultural Botany*.

5.—FARM INSECTS. Class work, two hours. Two credits.

In this course the student is familiarized with the recognition marks, life history, and specific means of controlling the most injurious of the insects commonly found on the farm. He is required to prepare plans of actual farming operations on different types of farms whereby insect damage to the crops will be reduced to a minimum or completely eliminated.

COURSE IN TESTING DAIRY PRODUCTS

This course is offered to those who are buying milk or cream and who wish to gain, in a short time, skill and accuracy in the application of the various tests necessary in such work. The law of the state requires that all persons buying milk or cream by test must pass a satisfactory examination and secure a certificate from the State Dairy Commissioner. This course is designed to meet the needs of those who find they have not sufficient knowledge of the subject to pass such an examination.

In addition to a study of the Babcock test, the student receives lectures on ordinary sanitation, and learns the methods necessary to keep his place of business in a sanitary condition. Exercises are given in grading milk and cream, and in methods of handling cream so as to keep it in condition until used or delivered at the railway station. This course is offered at different periods throughout the year, dates being announced a few days previous to the opening of each period.

REQUIREMENTS FOR ADMISSION

Students over seventeen years of age are admitted to these courses without examination. Students under seventeen years of age are admitted without examination, provided they present a certificate showing that they have completed the eighth grade in the common-school course, or its equivalent.

All students entering short courses are required to be present at the beginning of the term, and will not be admitted later.

Certificate.—A certificate is granted to students completing the work of the first and second years.

Cost.—The expenses for ten weeks need not exceed \$50 to \$75, exclusive of railroad fare. A fee of \$3 is charged for the term, payable at enrollment. Reference books will cost from \$5 to \$10. For information write W. M. Jardine, Acting Dean of the Division of Agriculture, Kansas State Agricultural College, Manhattan, Kan.

Agriculture in the Summer School

At the present time the greatest hindrance to the general introduction of agriculture into the high schools and grade schools of the State is a lack of properly prepared teachers. In order to give the teachers of the State an opportunity to fit themselves to introduce this subject successfully into their schools, the College offers summer courses in agriculture, in which especial emphasis is laid upon the subject matter and methods adapted to secondary and primary schools.

The work offered consists in part of some of the regular subjects of the College courses, including a thorough study of farm crops, especially corn and small grains, in which growing as well as matured crops are available for laboratory work. Courses are also available in the study of market types and classes of beef cattle, dairy stock, sheep and swine, with extensive practice in stock judging. Instruction is also given in dairying, poultry husbandry, general horticulture, landscape gardening, and orcharding. In addition to these subjects from the College courses, special classes are organized to meet the needs of teachers of agriculture in the rural schools, in the high schools, and in the lower grades.

A special circular giving details of the Summer School may be obtained by application to the President of the College. The article in this catalogue on the Summer School gives brief information.

Division of Mechanic Arts

EDMUND BURKE MCCORMICK, *Dean.*

The Division of Mechanic Arts includes courses in mechanical engineering, electrical engineering, civil engineering, architecture, and printing, each leading to the degree of bachelor of science in the profession selected.

The work of the freshman year is the same in all courses, except the course in printing; the work of the sophomore year is the same for students of mechanical engineering and electrical engineering, and, except that surveying is substituted for shop work, is the same for the course in civil engineering. For the course in architecture the plan of studies for the sophomore year is somewhat further modified.

The course in printing necessarily differs from the others throughout, because the nature of the work for which the young men are trained is far different.

While the courses offered are believed to be sufficient to cover the needs of the average young man, it is possible to combine portions of the work of two or more of these courses in such a way that one may be prepared to take up a special line of work for which he desires to fit himself. For example, by substituting certain subjects from the departments of chemistry and geology for some of those in the course in mechanical engineering, a young man can fit himself for work in connection with the manufacture of cement. By substituting some of the subjects in chemistry for others in mechanical engineering, a special preparation can be secured for chemical engineering. By combining some of the subjects of the courses in civil and mechanical engineering and by taking additional work in chemistry and geology, a young man may fit himself for special work in connection with the development of the coal fields throughout the country. By combining work in the courses in architecture and civil engineering, specialization in architectural engineering may be secured. In special cases permission will be granted to combine the work on the lines here indicated.

However, it is believed that the courses as tabulated give the best preparation for students expecting to follow general work in the profession selected, and for those who are not absolutely certain what branch of their profession they will follow. The substitutions and combinations indicated, and others similar to them, will be permitted only when there is good evidence that

the student desiring such work is practically certain to follow the branch selected.

In the case of any of these modifications, the degree granted will be that of the course in which the major portion of the work is taken. In no case will the substitution of an additional amount of technical work for any of the general cultural work in the course be allowed.

COURSE IN MECHANICAL ENGINEERING

The course in mechanical engineering is designed to fit men for positions of authority and responsibility in this profession. It prepares for the successful management and superintendence of factories and power plants; for the design of power and machinery installations; for the design and construction of machine tools, steam and gas engines, compressors, hydraulic machinery, etc.; and for the design and erection of mill and engineering buildings.

The course of study has been laid out with the aim of securing a judicious mixture of theory and practice, such as will not only give the student the technical skill required for engineering operations, but will also give him a broad grasp of the fundamental principles of his profession.

It is not the intention in this course to give the young man training similar to that received in serving an apprenticeship, but rather to instruct him in the technical and theoretical principles upon which the art of mechanical engineering is based, without a thorough knowledge of which a man can not rise to a position of responsibility in this profession. The advantages of combining a practical application of principles with theoretical instruction, while these principles are being impressed upon the student by classroom work, are well known.

The course in shop work, being purely educational in its character, is designed to teach the various methods of doing shop work, the operations that may be performed upon the different machines, and upon what machines certain operations can be performed most economically, as well as to acquaint the student with what may be expected not only from the machines, but from the men operating them. In order to secure this knowledge it is necessary that the student should perform a large variety of operations. To accomplish this result, an appreciable proportion of the course consists of graded exercises. Wherever possible the student also is assigned to work on apparatus and machinery that is being built for use in the engineering or other departments of the College, a large amount of which is constantly under way in the shops.

Each student in the course in mechanical engineering is required to present before graduation a satisfactory thesis that shows the results of original research along engineering lines.

COURSE IN ELECTRICAL ENGINEERING

The essential elements underlying a sound engineering training are based upon a thorough study of mathematics and the physical sciences. The professional work of this course begins in the third year and continues throughout the rest of the course. General culture subjects are offered during the first three years of the course.

Emphasis is placed upon training to deal with forces and matter according to scientific principles, rather than upon the accumulation of facts. The department laboratories are well equipped with the various measuring instruments, standardizing apparatus, and the different types of dynamo machinery. The different subjects are presented in the classroom, and the classroom work is supplemented by laboratory practice. The course provides a liberal training in wood- and iron-working, mechanical drawing, and machine-shop practice. The laboratory experiments selected for the student are designed to give a clear conception of the theoretical work of the classroom.

Students are given extensive practice in connecting up the different types of machines for testing purposes and for standard commercial work. This practice work and testing extends throughout the junior and senior years, and is intended to give the student familiarity with the underlying principles of the different machines, and a knowledge of the care necessary to operate them successfully. Opportunity is also given to undertake the investigation of commercial problems as they are sent to the College from the different central stations of the State.

In connection with the regular work of the classroom and the laboratory, extensive references are given to leading books and to current literature on technical engineering. In connection with the laboratory work a certain amount of library work is required. In the year 1908 a College branch of the American Institute of Electrical Engineers was organized. The branch meets the first Tuesday of each month. At these meetings the instructors meet with the students for the discussion of technical subjects in engineering. Consulting engineers and central-station managers are invited to present papers at these meetings.

COURSE IN CIVIL ENGINEERING

The aim of the course in civil engineering, as outlined in the catalogue, is to give to the young men taking the course the best possible preparation for entering upon the active practice of the profession under present conditions. It will be noted that the first and second years of the course are devoted almost entirely to general culture studies and the sciences, including mathematics. This follows the arrangement generally found

in the engineering courses of American colleges. It finds its justification in the well-nigh universally accepted idea that any engineering education worthy of consideration must be grounded upon ample preliminary education in the allied sciences. In recognition of the mechanical trend of the age, liberal provision is made in the course for class and laboratory work in mechanical and electrical engineering.

Manhattan is located at the junction of the Kansas and Big Blue rivers, so that there are several bridges in the vicinity which serve as examples of practical construction for students of structural engineering. The proximity of the rivers also makes it possible for the students to work on problems of river hydraulics on a practical scale. The topography of the country surrounding the College is particularly favorable to field practice in the various branches of surveying, and as much time as possible is devoted to actual field operations with the common surveying instruments of the engineer.

In view of the growing importance of municipal problems, such as paving, sewerage and water-supply, the course in civil engineering includes a required course in municipal engineering, supplemented by courses in sanitary biology and chemistry.

The work in highway engineering, coming at the end of the senior year, affords time for an unusually thorough course in this subject, which is of such great importance at the present time.

A liberal course in drainage and irrigation engineering is introduced for those who may wish to take up this line of work, which is coming rapidly into prominence.

COURSE IN ARCHITECTURE

The course in architecture at the Kansas State Agricultural College was organized in 1904 to meet an urgent demand for designers and builders, a demand caused by the rapidly increasing wealth of the State, which showed itself in every county by the erection of modern residences, large business blocks, and substantial public buildings. It was manifest that there was a lack of properly trained architects and contractors, while there was not a technical institution within several hundred miles of Manhattan that had made provision for the study of architecture and its basic sciences. The first class of students graduated from the newly organized course in 1905, and since that year there have been a number of graduates every spring, while many more have taken partial courses.

The freshman year of the course in architecture is identical with that of the other courses of the division of mechanic arts. The other three years are devoted to the study of pure and applied mathematics, mechanics, physics, history of architecture, municipal improvements, modern steel and cement construc-

tion, landscape architecture, and especially to the study of drawing and drafting. The course aims to develop the creative powers of the student in the fields of original composition. From ten to sixteen hours per week, for the last three years of the course, are given to work of this kind over the drawing table.

The College is well equipped for the maintenance of a course in architecture. Its mechanical workshops are the most extensive west of the Missouri river; its science laboratories are provided with an abundance of modern scientific apparatus; it owns a rapidly growing collection of several hundred plaster casts, tile and terra cotta samples, marble specimens, etc. It has a fine collection of models of the classic orders; a collection of blue-prints of over fifty residences, schoolhouses and churches, and of nearly all the Kansas state buildings; a large number of modern books on architecture and engineering; a complete set of the international edition of the *American Architect*; a complete set of the *Inland Architect*, and sets of several European architectural magazines; a well-equipped blue-print room, etc. The substantial stone buildings of the institution, their complete system of water-supply, drainage, heating and lighting, and one of the largest and handsomest campuses in America, furnish excellent illustrative material.

Students taking the course in architecture are expected to devote their summer vacations to practical work in actual building operations.

Course in Mechanical Engineering

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
English I 4 (4-0)	English II 4 (4-0)	Extempore Speech 2 (2-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Library Methods E 1 (0-2)
Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)	Principles of Engineering 1 (1-0)
Descriptive Geometry I 3 (2-2)	Descriptive Geometry II 3 (2-2)	Chemistry III 4 (3-2)
Blacksmithing I 3 (1-4)	Blacksmithing II 3 (1-4)	Analytical Geometry 4 (4-0)
Military Drill	Military Drill	Descriptive Geometry III 3 (2-2)
		Foundry 3 (1-4)
		Military Drill

SOPHOMORE

Advanced Industrial Hist'y 4 (4-0)	English Literature 4 (4-0)	Surveying 3 (1-4)
Engineering Physics I 5 (4-2)	Engineering Physics II 5 (4-2)	Engineering Physics III 6 (4-4)
Differential Calculus 4 (4-0)	Integral Calculus 4 (4-0)	Kinematics I 4 (4-0)
Mechanical Drawing I 2 (1-2)	Mechanical Drawing II 3 (1-4)	Mechanical Drawing III 3 (0-6)
Pattern Making 3 (1-4)	Machine Shop I 2 (0-4)	Machine Shop II 2 (0-4)
Military Drill	Military Drill	Military Drill

JUNIOR

Economics 4 (4-0)	Business Law 2 (2-0)	Hydraulics 4 (3-2)
Applied Mechanics I 5 (4-2)	Business Organization 2 (2-0)	Graphic Statics 2 (0-4)
Steam Engineering I 3 (3-0)	Applied Mechanics II-M 5 (4-2)	Applied Mechanics III 4 (3-2)
Kinematics II 3 (2-2)	Steam Engineering II 4 (3-2)	Steam Engineering III 4 (3-2)
Machine Shop III 3 (1-4)	Mechanical Drawing IV 2 (0-4)	Mechanical Drawing V 2 (0-4)
	Machine Shop IV 3 (1-4)	Machine Shop V 2 (0-4)

SENIOR

Applied Mechanics IV 3 (2-2)	Factory Engineering 4 (2-4)	Refrigeration 3 (2-2)
Steam Engineering IV 4 (3-2)	Gas Engineering 4 (3-2)	Power Plant Engineering 4 (1-6)
Electrical Engineering M-I 5 (4-2)	Electrical Engineer'g M-II 5 (4-2)	Heating and Ventilation 5 (2-6)
Machine Design I 3 (1-4)	Machine Design II 2 (0-4)	Machine Design III 2 (0-4)
Hydraulic Machinery 3 (2-2)	Machine Shop VI 2 (0-4)	Machine Shop VII 2 (0-4)
Thesis	Thesis	Thesis

Course in Electrical Engineering

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
English I 4 (4-0)	English II 4 (4-0)	Extempore Speech 2 (2-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Library Methods E 1 (0-2)
Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)	Principles of Engineering 1 (1-0)
Descriptive Geometry I 3 (2-2)	Descriptive Geometry II 3 (2-2)	Chemistry III 4 (3-2)
Blacksmithing I 3 (1-4)	Blacksmithing II 3 (1-4)	Analytical Geometry 4 (4-0)
Military Drill	Military Drill	Descriptive Geometry III 3 (2-2)
		Foundry 3 (1-4)
		Military Drill

SOPHOMORE

Advanced Industrial Hist'y 4 (4-0)	English Literature 4 (4-0)	Surveying 3 (1-4)
Engineering Physics I 5 (4-2)	Engineering Physics II 5 (4-2)	Engineering Physics III 6 (4-4)
Differential Calculus 4 (4-0)	Integral Calculus 4 (4-0)	Kinematics I 4 (4-0)
Mechanical Drawing I 2 (1-2)	Mechanical Drawing II 3 (1-4)	Mechanical Drawing III 3 (0-6)
Pattern Making 3 (1-4)	Machine Shop I 2 (0-4)	Machine Shop II 2 (0-4)
Military Drill	Military Drill	Military Drill

JUNIOR

Economics 4 (4-0)	Seminar E-II 1 (1-0)	Business Law 2 (2-0)
Seminar E-I 1 (1-0)	Applied Mechanics I 5 (4-2)	Business Organization 2 (2-0)
Applied Mechanics I 5 (4-2)	Applied Mechanics II CE 6 (4-4)	Hydraulics 4 (2-2)
Theory of Electricity I 5 (4-2)	Theory of Electricity II 5 (4-2)	Electrical Instruments and Calibration 4 (2-4)
Machine Shop III 3 (1-4)	D. C. Machines I 6 (4-4)	D. C. Machines II 6 (4-4)

SENIOR

D. C. Machine Design 4 (2-4)	Seminar E-III 2 (2-0)	Generation and Distribution of Electrical Energy 4 (4-0)
Steam and Gas Engineering E-I 5 (4-2)	Steam and Gas Engineering E-II 5 (4-2)	Refrigeration 3 (2-2)
A. C. Machine I 6 (4-4)	A. C. Machine II 6 (4-4)	Power Plant Design and Specifications 4 (1-6)
Hydraulic Machinery 3 (2-2)	Telephone Engineering 4 (3-2)	A. C. Machine Design 2 (1-2)
	Thesis	Illuminating Engineering 3 (2-2)
		Thesis

Course in Civil Engineering

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
English I 4 (4-0)	English II 4 (4-0)	Extempore Speech 2 (2-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Library Methods E 1 (0-2)
Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)	Principles of Engineering 1 (1-0)
Descriptive Geometry I 3 (2-2)	Descriptive Geometry II 3 (2-2)	Chemistry III 4 (3-2)
Blacksmithing I 3 (1-4)	Blacksmithing II 3 (1-4)	Analytical Geometry 4 (4-0)
Military Drill	Military Drill	Descriptive Geometry III 3 (2-2)

SOPHOMORE

Differential Calculus 4 (4-0)	Integral Calculus 4 (4-0)	Kinematics I 4 (4-0)
Engineering Physics I 5 (4-2)	Engineering Physics II 5 (4-2)	Engineering Physics III 6 (4-4)
Mechanical Drawing I 2 (1-2)	Mechanical Drawing II 3 (1-4)	Foundations 2 (2-0)
Surveying I 7 (4-6)	Chemistry C 5 (1-8)	Sanitary Biology I 3 (1-4)
Military Drill	Military Drill	English Literature 4 (4-0)

JUNIOR

Economics 4 (4-0)	Business Law 2 (2-0)	Engineering Geology 6 (4-4)
Sanitary Biology II 8 (1-4)	Business Organization 2 (2-0)	Hydraulics 4 (3-2)
Applied Mechanics I 5 (4-2)	Advanced Industrial Hist'y 4 (4-0)	Applied Mechanics III 4 (3-2)
Surveying II 6 (3-6)	Graphic Statics 2 (0-4)	Civ. Engineer'g Drawing II 4 (1-6)
	Applied Mechanics II CE 6 (4-4)	
	Civil Engineering Drawing I 2 (0-4)	

SENIOR

Bridge Stresses 4 (4-0)	Bridge Design 6 (3-6)	Electrical Engineering C 4 (3-2)
Steam & Gas Engineering C 4 (3-2)	Railway Engineering I 3 (3-0)	Railway Engineering II 4 (0-8)
Drainage and Irrigation Engineering 3 (3-0)	Masonry and Concrete 5 (3-4)	Geodesy 4 (2-4)
Water Supply & Sewerage 4 (4-0)	Astronomy 3 (3-0)	Highway Engineering 3 (3-0)
Hydraulic Machinery 3 (2-2)		
Thesis	Thesis	Thesis

Course in Architecture

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
English I 4 (4-0)	English II 4 (4-0)	Extempore Speech 2 (2-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Library Methods E 1 (0-2)
Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)	Principles of Engineering 1 (1-0)
Descriptive Geometry I 3 (2-2)	Descriptive Geometry II 3 (2-2)	Chemistry III 4 (3-2)
Blacksmithing I 3 (1-4)	Blacksmithing II 3 (1-4)	Analytical Geometry 4 (4-0)
Military Drill	Military Drill	Descriptive Geometry III 3 (2-2)
		Foundry 3 (1-4)
		Military Drill

SOPHOMORE

Advanced Industrial Hist'y 4 (4-0)	English Literature 4 (4-0)	Sanitary Biology I 3 (1-4)
Residences 4 (4-0)	Historic Ornament 4 (4-0)	Kinematics I 4 (4-0)
Engineering Physics I 5 (4-2)	Engineering Physics II 5 (4-2)	Engineering Physics III 6 (4-4)
Shades and Shadows 2 (0-4)	Linear Perspective 2 (0-4)	Surveying 3 (1-4)
Architectural Drawing I 3 (0-6)	Architectural Drawing II 3 (0-6)	Architectural Drawing III 2 (0-4)
Military Drill	Military Drill	Military Drill

JUNIOR

Economics 4 (4-0)	Business Law 2 (2-0)	Engineering Geology 6 (4-4)
Acoustics 1 (1-0)	Business Organization 2 (2-0)	
History of Architecture I 4 (4-0)	History of Architecture II 4 (4-0)	History of Architecture III 4 (4-0)
Sanitary Biology II 3 (1-4)	Heating 4 (4-0)	Graphic Statics 2 (0-4)
Clay Modeling 3 (0-6)	Color and Design A 3 (0-6)	Mural Decoration 2 (0-4)
Architect'1 Composition I 3 (0-6)	Architect'1 Composition II 3 (0-6)	Architect'1 Composition III 3 (0-6)

SENIOR

Public Buildings 4 (4-0)	Specifications 4 (4-0)	
Plumbing 2 (2-0)	Trusses 4 (2-4)	Landscape Architecture 4 (4-0)
Beams and Arches 3 (1-4)	Architectural Seminar 4 (4-0)	Power and Lighting 4 (3-2)
Municipal Improvements 4 (4-0)	Color Rendering 2 (0-4)	Landscape Design 4 (0-8)
Ink Rendering 2 (0-4)		
Architect'1 Composition IV 3 (0-6)	Architect'1 Composition V 3 (0-6)	Thesis 7 (0-14)

Applied Mechanics and Hydraulics

Professor SEATON.

The courses in applied mechanics are designed primarily to teach the graphical and analytical methods of determination both of the forces acting on the parts of structures and machines, and of the effect of these forces on the parts, together with the fundamental principles of the design of the parts to meet specified conditions. The course is intended to be of a highly practical character. For the purpose of better fixing in the mind of the student the principles taught, the solution of a large number of problems involving these principles is required in both the applied mechanics and the hydraulics. The principles are further illustrated by means of the laboratory and drafting-room work, which parallels the classroom instruction. The textbooks in several of the courses are supplemented by notes and assigned reference work.

COURSES IN APPLIED MECHANICS AND HYDRAULICS

1.—APPLIED MECHANICS I. Junior year, fall term. Class work, four hours; laboratory, two hours. Five credits. Required in all the engineering courses. Prerequisites: Differential Calculus; Integral Calculus; Engineering Physics III.

This course includes analytical mechanics treating of composition, resolution, and conditions of equilibrium of concurrent and nonconcurrent forces; center of gravity; laws of rectilinear and curvilinear motion of material points; moments of inertia; relations between forces acting on rigid bodies and the resulting motions; work, energy and power; graphical solutions of problems in statics. Text, Hancock's *Applied Mechanics for Engineers*.

Laboratory.—See Power and Experimental Engineering 1.

2.—APPLIED MECHANICS II. Junior year, winter term. Class work, four hours; laboratory, two or four hours. Five or six credits. Required in all the engineering courses. Prerequisite: Applied Mechanics I.

This course treats of the following: behavior of materials subjected to tension, compression, and shear; riveted joints; torsion; shafts, and the transmission of power; strength and stiffness of beams and cantilevers; bending moments and shear forces in beams; design of beams of wood, cast iron, steel, and reinforced concrete; design of built-up beams and box girders; resilience of beams; stresses in columns and hooks; and the design of columns of wood, cast iron, steel, and concrete. Text, Boyd's *Strength of Materials*. *Cambria Steel* is used for reference.

Laboratory.—See Power and Experimental Engineering 2.

3.—GRAPHIC STATICS. Junior year, winter and spring terms. Drafting-room practice, supplemented by lectures, four hours. Two credits. Required in all the courses of the division except those in electrical engineering. Prerequisite: Applied Mechanics II, except that the two courses may be taken together.

The graphical solution of stresses existing in a number of typical bridge and roof trusses, with a detail design of one of the simpler forms of roof trusses.

4.—APPLIED MECHANICS III. Junior year, spring term. Class work, three hours; laboratory, two hours. Four credits. Required in all of the

courses of the division except those in architecture and electrical engineering. Prerequisite: Applied Mechanics II.

This course treats of stresses in continuous and built-in beams; masonry arches and arch ribs; stability of dams and retaining walls, properties of materials for reinforced concrete; mechanical bond; rectangular and T beams; double reinforced beams; web reinforcing; columns reinforced with bars and hoops; reinforced concrete in building construction; design of slabs, beams, girders, and columns. Text, Boyd's *Strength of Materials*, and Turneaure and Maurer's *Principles of Reinforced Concrete Construction*.

Laboratory.—See Power and Experimental Engineering 4.

5.—HYDRAULICS. Junior year, spring term. Class work, three hours; laboratory, two hours. Four credits. Required in all the engineering courses. Prerequisite: Applied Mechanics I.

This course includes a study of fluid pressure, stresses in containing vessels and pipes, center of pressure, immersion and flotation; of Bernoulli's theorem, with applications; of flow through orifices, weirs, short and long pipes; of loss of head due to various causes; of flow of water in open channels, and its measurement; of Kutter's formula; of impulse and reaction of a jet; of power of jets; of plates moving in fluids. Text, Russel's *Textbook on Hydraulics*.

Laboratory.—See Power and Experimental Engineering 5.

6.—APPLIED MECHANICS IV. Senior year, fall term. Class work, three hours. Three credits. Required in the course in mechanical engineering. Prerequisite: Applied Mechanics III.

Dynamics of machinery, friction, lubrication and lubricants, are studied in this course. Text, Lanza's *Dynamics of Machines*.

7.—HYDRAULIC MACHINERY. Senior year, fall term. Class work, two hours; laboratory, two hours. Three credits. Required in the courses in civil, electrical and mechanical engineering. Prerequisite: Hydraulics.

This course treats of elements of water power; design, construction and operation of gravity motors, impulse wheels and turbines; regulation of water motors; testing of impulse wheels and turbines; centrifugal, turbine and reciprocating pumps; pressure engines, accumulators, and hydraulic rams. Text, Church's *Hydraulic Motors*.

Laboratory.—See Power and Experimental Engineering 7.

Architecture and Drawing

Professor WALTERS.
Instructor HARRIS.
Instructor WEEKS.
Assistant MORTON.
Assistant CORTH.
Assistant PRATT.

The educational and practical value of a systematic course in the various branches of drawing can hardly be overestimated. The general aims of the several courses in industrial art are the same: (a) The cultivation of observation and analysis of form; (b) the development of correct taste; (c) the teaching of the different methods of graphic representation; (d) the acquirement of skill in handling drawing tools.

The instruction offered in architecture is intended to supply the preliminary training required for the practice of architecture and to prepare the student to pass the examinations required of architects by many cities

and states. It recognizes the fact that this instruction must have a three-fold object: First, the teaching of sound modern building construction; second, the teaching of the different methods of graphic representation; and third, the development of correct taste.

The first is attained, in connection with the work in other departments, by lectures, and by extended laboratory work in heating, plumbing, concrete construction, steel construction, and electric lighting, also by preparing building specifications and making investigations of the legal and ethical relations of architect, owner, and contractor. The second end involves the teaching of correct perception and analysis of form. An average of about twelve hours a week throughout the four years is given to projection drawing, descriptive geometry, isometric drawing, linear perspective, shades and shadows, sketching from casts and from life, architectural drawing, and architectural composition. The development of correct taste is probably the most difficult to accomplish. Even with the talented student its acquisition requires extended and persistent efforts of a greatly varied character. This is sought by offering much work in sketching and rendering, mural decoration, landscape architecture, architectural criticism, and architectural composition. Five terms are devoted to the study of the fundamental principles of design and the styles of the past.

COURSES IN ARCHITECTURE AND DRAWING

1.—OBJECT DRAWING. Freshman year, fall or spring term. Drafting room, four hours. Two credits. Required in the courses in general science, industrial journalism, and home economics.

The course comprises drawing from models and simple objects, and exercises in shading from the object and from imagination.

2.—GEOMETRICAL DRAWING. Freshman or sophomore year, winter term. Drafting room, four hours. Two credits. Required in the courses in general science, industrial journalism, and home economics.

In this course are taught construction of perpendiculars, parallels, angles, polygons, tangent connections, etc.; construction of the ovoid, oval, ellipse, and the spiral; use of T-square, triangles, drawing-board, and India ink; lettering.

3.—FREE-HAND DRAWING. Freshman year, winter or spring term. Drafting room, four hours. Two credits. Required in the course in industrial journalism; elective in the course in general science.

Exercises are given in drawing simple figures and ornaments illustrating the effects of geometric arrangement, radiation, repetition, symmetry, proportion, harmony, and contrast; in drawing conventional plant ornaments; in free-hand lettering.

4.—PROJECTION DRAWING. Freshman year, spring term. Drafting room, four hours. Two credits. Required in the course in general science.

The course includes projection of solids; sections of simple objects; construction of the conic section lines; development of surfaces; inter penetrations of solids; lettering, inking, and shading.

5.—DESCRIPTIVE GEOMETRY I. Freshman year, fall term. Lectures, two hours; drafting-room practice, two hours. Three credits. Required of all students in Division of Mechanic Arts.

The course includes projection of solids; rotation in space; sections of solids and simple objects; development of surfaces; construction of the conic-section lines; isometric projection; exercises in lettering, inking, and shading.

6.—DESCRIPTIVE GEOMETRY II. Freshman year, winter term. Lectures, two hours; drafting-room practice, two hours. Three credits. Required of all students in the Division of Mechanic Arts. Prerequisite: Descriptive Geometry I.

Projection, rotation, and measurement of the straight line and the angle in space; change of ground line; oblique projection; the plane and its traces; various problems pertaining to the straight line and the plane.

7.—DESCRIPTIVE GEOMETRY III. Freshman year, spring term. Lectures, two hours; laboratory, two hours. Three credits. Required of all students in the Division of Mechanic Arts. Prerequisite: Descriptive Geometry II.

The single and double curved surfaces of revolution; their tangents and tangent planes; development of surfaces of revolution; sections and inter penetrations of the cylinder, cone, and sphere; construction and sections of the hyperboloid of revolution and the paraboloid.

8.—COLOR AND DESIGN I. Freshman year, spring term. Drafting-room practice, four hours. Two credits. Required of students in the courses in home economics.

This course includes discussion of the nature and influence of color, its use and abuse, and the principles that underlie good design and consistent, harmonious color combinations. Original designs in construction and decoration as applied to fabrics, dress, and articles of common use in the home, that young women may recognize and appreciate that which is beautiful and appropriate, and may become more discriminating as purchasers.

9.—COLOR AND DESIGN A. Junior year, winter term. Laboratory, six hours. Three credits. Required in the course in architecture.

The influence and nature of color, and the principles that underlie good design and harmonious color combinations. The use and abuse of color in building operations.

10.—SHADES AND SHADOWS. Sophomore year, fall term. Drafting-room practice, four hours. Two credits. Required in the course in architecture. Prerequisite: Descriptive Geometry II.

Shadows upon the planes of projection; shadows upon oblique planes and curved surfaces; shades; exercises in brush shading.

11.—RESIDENCES. Sophomore year, fall term. Class work, four hours. Four credits. Required in the course in architecture.

Lectures on location, arrangement, construction, decoration, and sanitation of residences; study of modern residence styles; drawing to scale of plans, elevations, sections, and details of characteristic residences, involving construction in lumber, brick, stone, and concrete.

12.—HISTORIC ORNAMENT. Sophomore year, winter term. Class work, four hours. Four credits. Required in the course in architecture.

This is a course of illustrated lectures on the standard forms of Greek, Roman and Gothic moldings; the Etruscan, Doric, Ionic, Corinthian and composite columns and their entablatures; the lotus, anthemion, acanthus, and laurel ornament; Roman, medieval and modern lettering; the ornament of the Gothic period.

13.—LINEAR PERSPECTIVE. Sophomore year, winter term. Drafting room, four hours. Two credits. Required in the course in architecture; elective in others. Prerequisite: Geometrical Drawing.

Vanishing points; vanishing traces; measuring points; cylindric perspective and perspective corrections, are emphasized, and various exercises in representing geometric solids are given.

14.—CLAY MODELING. Junior year, fall term. Laboratory, six hours. Three credits. Required in the architectural course and elective in the course in general science.

This course includes clay and plaster modeling of architectural details, historic ornaments, and decorative statuary; also methods of making plaster casts.

15.—WORKING DRAWINGS. Sophomore year, spring term. Laboratory, four hours. Two credits. Required in the course in home economics, and elective in the course in general science.

Designing and drawing residence plans to scale. Detail drawing of furniture and various modern conveniences.

16 to 18.—ARCHITECTURAL DRAWING I, II, AND III. Sophomore year, fall, winter and spring terms. Laboratory, six hours; three credits for I and II. Laboratory, four hours; two credits for III. Required in the course in architecture.

The first term is given to the study of Gothic and Romanesque ornaments, tracery windows, and other details, from plaster models and blue-prints. The second term takes up the analysis and study of standard forms of the five orders. The third is devoted to the study of the modern residence and school building.

19.—HISTORY OF ARCHITECTURE I. Junior year, fall term. Class work, four hours. Four credits. Required in the course in architecture.

This study is taught by lectures, illustrated by photographs, plaster models, and stereopticon views. It comprises the development of the architecture of the ancient Egyptians, Chaldeans, Greeks, and Romans.

20.—HISTORY OF ARCHITECTURE II. Junior year, winter term. Class work, four hours. Four credits. Required in the course in architecture.

This course comprises a study of the architecture of the medieval and Renaissance periods; of the Byzantine, the Romanesque, the Moorish, the Gothic, and the Renaissance.

21.—HISTORY OF ARCHITECTURE III. Junior year, spring term. Class work, four hours. Four credits. Required in the course in architecture.

Study of the Neo-Greek and Neo-Roman architecture; the revival of the Gothic and Romanesque; the Colonial, the Mission, and the modern American architecture.

22 to 26.—ARCHITECTURAL COMPOSITION I, II, III, IV, V. This work begins with the fall term of the junior year and extends through five consecutive terms. Laboratory, six hours a week. Three credits each term. Required in the course in architecture.

The first term is given to the planning of a residence, and involves the preparation of a complete set of plans and elevations, sections and detail drawings. The second term takes up the planning of a Gothic church. The third is given to the planning of a Romanesque school building. The fourth takes up the planning of a small public building in the modern Renaissance. The fifth is given to work in modern steel and concrete architecture of a monumental style. Sets of blue-prints of all finished work must be left with the department, if required by the professor in charge of this work.

27.—PUBLIC BUILDINGS. Senior year, fall term. Class work, four hours. Four credits. Required in the course in architecture. Prerequisite: Residences; Historic Ornament.

This course embraces lectures on location, floor arrangements, building materials, style, interior finish, decoration, etc., of schoolhouses, churches, libraries, courthouses, exposition buildings, and other public buildings.

28.—MURAL DECORATION. Junior year, spring term. Laboratory, four hours. Two credits. Required in the course in architecture. Prerequisite: Color and Design A.

Each student is required to make a series of large water-color studies of interior wall-decoration schemes, including original designs for borders and centerpieces.

29.—HEATING. Junior year, winter term. Class work, four hours. Four credits. Required in the course in architecture.

Discussion of the phenomena and laws of heat generation and propagation. Systems of heating by means of air, water, and steam. Modern methods of ventilation. The subject is taught by lectures.

30.—PLUMBING. Senior year, fall term. Class work, two hours. Two credits. Required in the course in architecture. Prerequisite: Sanitary Biology I and II.

This course comprises lectures on water supply, plumbing and sewerage of residences; study of city plumbing ordinances and of disposition of sewage.

31.—MUNICIPAL IMPROVEMENTS. Senior year, fall term. Class work, four hours. Four credits. Required in the course in architecture.

This is a course of lectures on sidewalk construction, guttering and paving, sanitary sewers and sewage disposition, water supply, etc.

32.—BEAMS AND ARCHES. Senior year, fall term. Class work, three hours. Three credits. Required in the course in architecture. Prerequisite: Graphic Statics.

A course of lectures on the statics of steel and wood beams, posts, and struts, stone lintels, arches and concrete, reinforced concrete construction. Text, Kidder's *Handbook for Architects*.

33.—TRUSSES. Senior year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required of architectural students. Prerequisite: Beams and Arches.

Methods of construction and graphic analysis of standard wood and steel trusses. Text, Kidder's *Handbook for Architects*.

34.—SPECIFICATIONS. Senior year, winter term. Class work, four hours. Four credits. Required in the course in architecture.

Discussion and preparation of standard specifications for some of the residences and public buildings planned by the student in the classes in composition. Estimates of the materials and labor required in erecting and completing these buildings. Methods of making lump estimates. Discussion of the principles and form of building contracts. Study of the legal relations of the architect, the owner, and the contractor. Discussion of State laws concerning the erection of public buildings; labor laws; lien laws; city ordinances; building permits; building insurance; contracts and bonds. No textbook required.

35.—LANDSCAPE ARCHITECTURE. Senior year, spring term. Class work, four hours. Four credits. Required in the course in architecture.

Discussion and study of the principles of landscape design, location and construction of roads and walks, the disposition of trees, shrubs, lawns, and water as landscape features, etc.

36.—LANDSCAPE DESIGN. Senior year, spring term. Laboratory, eight hours. Four credits. Required in the course in architecture.

Each student is required to draw and finish in water color a set of plates representing his original designs for a home lot, a public square, a campus, and a small park. No textbook is required.

37.—ARCHITECTURAL SEMINAR. Senior year, winter term. Class work, four hours. Four credits. Required in the course in architecture.

Critical study of public buildings, such as the Manhattan library, the Riley county courthouse, the buildings of the College, etc. Study and discussion of the work of American architects, such as Smithmeyer, Upjohn, and Richardson. Critical study of the competitive designs for St. John's cathedral in New York, the State University of California, etc. No textbook is required.

38.—THESIS. Senior year, spring term. Fourteen hours, seven credits. Required in the course in architecture before graduation.

In the winter and spring of the senior year the student prepares a thesis, consisting of a set of original drawings, complete with details and specifications, for a public building. This work must be done in the drafting room of the department and under the supervision of the professor of architecture, who decides on the cost limit and style of the building and the size and number of plates required.

39.—HOME ARCHITECTURE. Senior year, winter term. Laboratory, four hours. Two credits. Required in the course in home economics.

Study, and drawing in ink, of floor plans, details and front elevations of modern residences.

40.—HOME DECORATION. Senior year, spring term. Laboratory, four hours. Two credits. Required in the course in home economics.

A study of design in its application to the home, its plan, furniture, and decorations. Emphasis is laid upon the refining and educating influence of well-chosen and appropriate decoration, the importance of simplicity being urged. Lectures on fine arts and the handicrafts, teaching that the home should show that fine art and industrial art are not to be considered separately. Problems in planning and decorating houses.

41.—INK RENDERING. Senior year, fall term. Laboratory, four hours. Two credits. Required in the course in architecture, elective elsewhere.

Perspectives of buildings and ornamental details; rendering in ink; studio methods. Prerequisite: Linear Perspective.

42.—COLOR RENDERING. Senior year, winter term. Laboratory, four hours. Two credits. Required in the course in architecture, elective elsewhere.

Rendering of buildings with their landscape environments, by means of ink or sepia washes, or in water color.

Civil Engineering

Professor CONRAD.
Assistant FRAZIER.

The instruction in civil engineering is given by means of lectures and recitations, and by practice in the field, in the drafting room, and in the laboratory. The professional work begins in the fall term of the sophomore year, in which the work in surveying is started. The heaviest professional work of the courses falls in the junior and senior years, during which, in addition to studies in other departments, courses are given in civil engineering drawing and in the analysis of stresses in framed structures, structural design, drainage and irrigation engineering, construction and design in masonry and concrete, railway and highway engineering, spherical trigonometry, astronomy, and geodesy. During the entire senior year considerable time is devoted to thesis work.

In addition to the laboratory equipment found in the mechanical and electrical engineering laboratories, which is available to civil engineering students as well, the Department of Civil Engineering possesses a good assortment of transits, levels, plane tables, tapes, and chains.

1.—SURVEYING. Sophomore year, fall and spring terms. Class work, one hour; field work, four hours. Three credits. Required in the courses in architecture and mechanical engineering. Prerequisite: Trigonometry.

This is a brief course in the care and use of engineer's surveying instruments. The greater part of the time is devoted to exercises and practical problems involving the use of the transit and level. Text, Pence and Ketchum's *Surveying Manual*.

2.—SURVEYING I. Sophomore year, fall term. Class work, four hours; field and drafting-room work, six hours. Seven credits. Required in the course in civil engineering. Prerequisite: Trigonometry.

The textbook work in this course deals with the use and care of instruments, land topographic and hydrographic surveying. The field and drafting work is devoted to exercises in the use of engineer's surveying instruments and plotting plane surveys. Text, J. B. Johnson's *Theory and Practice of Surveying*.

3.—FOUNDATIONS. Sophomore year, spring term. Class work, two hours. Two credits. Required in the course in civil engineering.

This course is devoted to a study of the principles underlying the design and construction of foundations of all characters in common use at the present time. Text, Fowler's *Ordinary Foundations*.

4.—SURVEYING II. Junior year, fall term. Class work, three hours; field and drafting-room work, six hours. Six credits. Required in the course in civil engineering. Prerequisite: Surveying I.

Recitation work in this course deals with city and mine surveying, computations of volumes, and railroad curves. The field and drafting work is devoted principally to topographical surveying and plotting. Text, J. B. Johnson's *Theory and Practice of Surveying*.

5.—CIVIL ENGINEERING DRAWING I. Junior year, winter term. Drafting-room work, four hours. Two credits. Required in the course in civil engineering. Prerequisites: Mechanical Drawing I and II.

This course is devoted to the application of the elementary principles of stereotomy, shades and shadows, isometric drawing, and perspective. These principles are explained to the student by such short lectures as seem necessary for the purpose. No textbook is used.

6.—BRIDGE STRESSES. Senior year, fall term. Class work, four hours. Four credits. Required in the course in civil engineering. Prerequisites: Applied Mechanics I and II.

This course involves the study of the algebraic method of computing the stresses in bridges and buildings, leading up to the subject of structural design the following term. Text, Merriman and Jacoby's *Roofs and Bridges*, Part I.

7.—WATER SUPPLY AND SEWERAGE. Senior year, fall term. Class work, four hours. Four credits. Required in the course in civil engineering. Prerequisite: Hydraulics.

This course deals briefly with the problems of designing and constructing sewer systems and disposal plants for cities of moderate size. Water supply for cities is studied from the standpoints of consumption, collection, storage, distribution, and purification. Texts, Turneaure and Russell's *Public Water Supplies* and Folwell's *Sewerage*.

8.—DRAINAGE AND IRRIGATION ENGINEERING. Senior year, fall term. Class work, three hours. Three credits. Required in the course in civil engineering. Prerequisite: Hydraulics.

In this course a study is made of the application of engineering principles to the design and construction of drainage and irrigation works. Considerable attention is paid to the development of ground water supplies for irrigation. Any senior engineering student may enter the course. Texts, Wilson's *Irrigation Engineering* and Elliott's *Engineering for Land Drainage*.

9.—BRIDGE DESIGN. Senior year, winter term. Class work, three hours; drafting-room exercises, six hours. Six credits. Required in the course in civil engineering. Prerequisites: Bridge Stresses, Applied Mechanics II, and Civil Engineering Drawing II.

This is a study of the design of timber and of metal structures. Text, Merriman and Jacoby's *Roofs and Bridges*, Part III.

Laboratory.—In the drafting room the time is chiefly devoted to working out the details of a plate girder and of a railroad or highway bridge.

10.—MASONRY AND CONCRETE. Senior year, winter term. Class work, three hours; drafting-room work, four hours. Five credits. Required in the course in civil engineering. Prerequisites: Applied Mechanics I, II, and III.

The classroom work takes up the study of the design and construction of structures of masonry and concrete, both plain and reinforced. The time spent in the drafting room is devoted to the design of concrete and masonry retaining walls, dams, arches, slab and girder bridges, except for the architectural engineers, who devote their time to working up building designs in reinforced concrete. Text, Taylor and Thompson's *Concrete*.

11.—ASTRONOMY. Senior year, winter term. Class work, three hours. Three credits. Required in the course in civil engineering. Prerequisites: Trigonometry; Surveying II.

This course is given to civil engineering students as a preparation for geodesy the following term. The course, as given, is a practical one, designed to familiarize the student with methods of determining latitude, longitude and azimuth with the ordinary engineer's surveying instruments. Text, Hosmer's *Practical Astronomy*.

12.—RAILWAY ENGINEERING I. Senior year, winter term. Class work, three hours. Three credits. Required in the course in civil engineering. Prerequisites: Surveying I and II.

This is a short course in the theory of railroad engineering, based on Wellington's economic theory. Considerable time is also devoted to the study of track construction and maintenance, and of the design of the yards and terminals. Texts, Raymond's *Elements of Railroad Engineering*, and Nagle's *Field Manual for Railroad Engineers*.

13.—RAILWAY ENGINEERING II. Senior year, spring term. Drafting-room or field exercises, eight hours. Four credits. Required in the course in civil engineering. Prerequisite: Railway Engineering I.

This is a continuation of the preceding course. The time is devoted principally to the field and office work of railway engineering. In the field a reconnaissance and survey of a short line is made, and the office work consists in working up the maps, profiles, and estimates from the survey. Texts, Raymond's *Elements of Railroad Engineering* and Nagle's *Field Manual for Railroad Engineers*.

14.—CIVIL ENGINEERING DRAWING II. Senior year, spring term. Class work, one hour; drafting-room work, six hours. Four credits. Prerequisite: Civil Engineering Drawing I.

This is, during the first part of the term, a continuation of the course

in graphic statics. About three-fourths of the term is devoted to the design of roof trusses of timber and steel. Text to be selected.

15.—HIGHWAY ENGINEERING. Senior year, spring term. Class work, three hours. Three credits. Required in the course in civil engineering.

The work in the classroom is devoted to a study of the theory and practice of economic highway and pavement construction and maintenance, including a study of the needs of traffic, of its effect on the road surface, and of the materials of construction. Text, Baker's *Roads and Pavements*.

16.—GEODESY. Senior year, spring term. Class work, two hours; field work, four hours. Four credits. Required in the course in civil engineering. Prerequisites: Surveying I and II; Astronomy.

Here the precise methods of surveying and leveling are studied. In the field the time is devoted to practice with the plane table, base-line measurement, triangulation, and precise leveling. Text, J. B. Johnson's *Theory and Practice of Surveying*.

17.—THESIS. Senior year, fall, winter, and spring terms. Required in the course in civil engineering.

Each student in the course in civil engineering is required to present, before graduation, a thesis on some subject which shall be related to his profession and shall constitute a report on an original investigation conducted by him.

Electrical Engineering

Professor HAMILTON, in Charge.
Assistant Professor LANE.
Assistant MILLER.

Instruction in the course is given by means of textbooks, lectures, and laboratory periods. The class work is carefully illustrated by means of demonstration apparatus and the projection lantern. The course is designed to provide the necessary preparation for young men who desire to engage in the practical field of electrical engineering, or for those who desire to assume the control of central stations as managers, as superintendents, or as consulting engineers.

The electrical laboratory for the work of the third year is provided with standard instruments of measurements, including standards of resistance, self-induction, capacity, etc. A complete line of standard makes of ammeters, voltmeters, wattmeters, and galvanometers is also provided. The different laboratories of the department are supplied with electric current from the following sources: 120-volt storage-battery circuit; 110-volt direct-current circuit; 110-volt alternating-current circuit, 220-volt direct-current circuit. Voltages up to 60,000 can be produced in the dynamo laboratory for testing purposes.

The electrical engineering laboratory is provided with a number of standard commercial machines, among them a 30-kilowatt 2300-volt polyphase alternating-current generator, a 15-kilowatt 125-volt alternating-current generator, a 7½-kilowatt synchronous converter, single and three-phase induction motors, a 5½-horsepower phase-wound induction motor, a 20-horsepower auxiliary pole 220-volt direct-current motor, a 26-horsepower 220-volt direct-current motor, a 15-kilowatt 125-volt generator, a 4½-kilowatt 125-volt direct-current generator, a Wood arc

machine, a 60-cell 160-ampere-hour storage battery, current transformers, arc lamps, constant potential transformers, 20,000- and 60,000-volt testing transformers, marble and slate switchboards, a Tirrel regulator, speed controllers, and a full line of ammeters, voltmeters, wattmeters, etc., for testing purposes.

COURSES IN ELECTRICAL ENGINEERING

1.—THEORY OF ELECTRICITY I. Junior year, fall term. Recitations and lectures, four hours; laboratory, two hours. Five credits. Required in the course in electrical engineering. Prerequisites: Engineering Physics II; Integral Calculus.

This course is an extension of the work in electricity in Engineering Physics II, and is a prerequisite to work in electrical engineering proper. A study is made of the phenomena and fundamental laws and principles of static electricity, the galvanic current, magnetism, and electromagnetism. Emphasis is laid upon the ultimate importance to the student of a thorough understanding of these subjects. Text, Pender's *Principles of Electrical Engineering*.

Laboratory.—The laboratory course continues the work of the classroom in giving the application of the fundamental principles, the experiments being so arranged as to follow the theoretical development of the subject.

2.—THEORY OF ELECTRICITY II. Junior year, winter term. Recitations and lectures, four hours; laboratory, two hours. Five credits. Required in the course in electrical engineering. Prerequisite: Theory of Electricity I.

This course is a continuation of the work begun in the fall term. It deals primarily with the general principles of electromagnetic induction, and gives an elementary treatment of alternating currents, including the effect of inductance and capacity. Text, Pender's *Principles of Electrical Engineering*.

Laboratory.—This work is a continuation of the laboratory work done in the preceding course, and gives the student a wide range of work in the use and manipulation of some of the higher-grade instruments used in electrical measurements.

3.—DIRECT-CURRENT MACHINES I. Junior year, winter term. Recitations or lectures, four hours; laboratory, four hours. Six credits. Required in the course in electrical engineering. Prerequisites: Integral Calculus; Theory of Electricity II.

The work consists of a detailed study of the fundamental principles of magnetic and electric circuits and their application to the various types of direct-current machines. Numerous problems involving the application of the principles are given as a part of the course. The class work is planned to coördinate with the work in the electrical engineering laboratory. Text, Franklin and Estey's *Elements of Electrical Engineering*, Vol. I.

Laboratory.—A series of experiments is outlined which is designed to necessitate careful, accurate measurement. The student is obliged to make all electrical connections with the necessary instruments in the circuit and to record the required data. From the laboratory records a written report upon each experiment or test must be submitted. The laboratory exercises include tests for armature and field resistance, potential curves, machine characteristics, motor and generator efficiencies.

4.—DIRECT-CURRENT MACHINES II. Junior year, spring term. Lectures or recitations, four hours; electrical engineering laboratory, four hours. Six credits. Required in the course in electrical engineering. Prerequisite: Direct-current Machines I.

This course is a continuation of Direct-current Machines I. It involves a detailed study of the various types of direct-current machinery with respect to theory and operation. The latter part of the course is devoted to a special examination of the different methods of testing generators and motors, and to the special application of the different classes of machines to commercial uses. Text, Franklin and Estey's *Elements of Electrical Engineering*, Vol. I.

Laboratory.—Special attention is given in this course to the different methods of determining generator and motor efficiencies and to the proper tabulation and interpretation of results.

5.—ELECTRICAL INSTRUMENTS AND CALIBRATION. Junior year, spring term. Lectures and recitations, two hours; calibration laboratory, four hours. Four credits. Required in the course in electrical engineering. Prerequisites: Theory of Electricity I and II.

This course includes a study of the different types of electrical measuring instruments and their application to electrical engineering testing. Text, Roller's *Electric and Magnetic Measurements*, supplemented by lectures.

Laboratory.—The laboratory work in this subject includes the calibration of both direct- and alternating-current measuring instruments and their uses in measuring current, potential power, resistance, inductance, and capacity.

6.—DIRECT-CURRENT MACHINE DESIGN. Senior year, fall term. Lectures, two hours; computation, four hours. Four credits. Required in the course in electrical engineering. Prerequisite: Direct-current Machines II.

The purpose of the course is to acquaint the student with the principles of commercial design of direct-current machinery. Each student is required to make the necessary calculations and drawings for a direct-current generator.

7.—ALTERNATING-CURRENT MACHINES I. Senior year, fall term. Recitations or lectures, four hours; laboratory, four hours. Six credits. Required in the course in electrical engineering. Prerequisites: Integral Calculus; Theory of Electricity II.

The work consists of a mathematical treatment of alternating-current phenomena. A study is made of the vector method of treating alternating-current problems. The solution of problems involving single and polyphase circuits forms an important part of the course. Text, Franklin and Estey's *Elements of Electrical Engineering*, Vol. I; Swenson and Frankenfield's *Testing of Electromagnetic Machinery*.

Laboratory.—It is the aim of this course to provide a series of experiments illustrating the theoretical work of the lecture room. Practice is given in the accurate measurement of capacity and inductance, and the effect of each upon the circuit. The latter part of the course is devoted to a study of polyphase circuits.

8.—ELECTRICAL ENGINEERING M-I. Senior year, fall term. Lectures or recitations, four hours; laboratory, two hours. Five credits. Required in the course in mechanical engineering.

This course covers the subject of direct-current machines with reference to the fundamental laws of the electric circuit; the principles of direct-current machinery; and the more important commercial tests. Text, Sheldon's *Direct-Current Machines*.

Laboratory.—Practice is given in the proper use of electrical measuring instruments. The experiments include a variety of tests requiring accurate observation, and a knowledge of the theory of dynamo machines. The various standard characteristic and efficiency tests are given. A written report on each test is required.

9.—ELECTRICAL ENGINEERING M-II. Senior year, winter term. Lectures and recitations, four hours; laboratory, two hours. Five credits. Required in the course in mechanical engineering. Prerequisites: Engineering Physics III; Integral Calculus.

The work covers briefly the important principles of alternating-current phenomena. The leading types of alternating-current machinery and apparatus are discussed with reference to their operation and their adaptability to different classes of service. Text, Sheldon's *Alternating-Current Machines*.

Laboratory.—The experimental work in this course includes practice in the use of alternating-current instruments; standard tests of alternators, motors, and transformers; and methods of operating the different types of alternating-current machinery.

10.—ALTERNATING-CURRENT MACHINES II. Senior year, winter term. Recitations or lectures, four hours; laboratory, four hours. Six credits. Required in the course in electrical engineering. Prerequisite: Alternating-Current Machines I.

This is a continuation of Alternating-Current Machines I. The course consists of a study of the theory of alternating-current machinery, alternators, synchronous motors, induction motors, transformers, and the various devices used in connection with alternating-current work. A study is also made of the application of the different types of machinery to industrial uses. Texts, Franklin and Estey's *Elements of Electrical Engineering*, Vol. II; Swenson and Frankenfield's *Testing of Electro-Magnetic Machinery*.

Laboratory.—This laboratory course consists of a series of experiments involving special and commercial tests of alternators, synchronous motors, transformers, and the different types of alternating-current machinery and apparatus.

11.—ILLUMINATING ENGINEERING. Senior year, spring term. Lectures or recitations, two hours; laboratory, two hours. Three credits. Required in the course in electrical engineering.

This course is devoted to a study of photometry and light standards and the principles of illumination. The different types of incandescent and arc lamps are discussed with reference to their efficiency and adaptability to different classes of lighting. Systems of street illumination are also studied.

12.—TELEPHONE ENGINEERING. Senior year, winter term. Class work, three hours; laboratory, two hours. Four credits. Required in the course in electrical engineering.

This course consists of a consideration of the principles of acoustics and alternating phenomena involved in telephone practice. A detailed investigation is made of telephone apparatus and circuits, with reference to their adaptation to various kinds of telephone service. This is followed by a study both of the design and maintenance of telephone lines and central-office apparatus, and of central-office methods, the selection of apparatus, and methods of handling telephone traffic. Text, Abbott's *Telephony*.

13.—ELECTRICAL ENGINEERING C. Senior year, spring term. Recitations or lectures, three hours; laboratory practice, two hours. Required in the course in civil engineering. Prerequisites: Engineering Physics III; Integral Calculus.

This work is designed to cover briefly the fundamental principles of direct-current and alternating-current machinery. Emphasis is laid upon the proper installation and operation of the different classes of machines.

Laboratory.—The laboratory practice is designed to give the student a knowledge of the most important commercial tests. The proper use of

electrical instruments is emphasized. A written report of each laboratory test is required.

14.—ALTERNATING-CURRENT MACHINE DESIGN. Senior year, spring term. Lectures, one hour; laboratory, two hours. Two credits. Required in the course in electrical engineering. Prerequisite: Alternating-Current Machines II.

This course embraces the elementary principles underlying the design of alternating-current apparatus. Students are required to make calculations and drawings for an alternating-current machine.

15.—GENERATION AND DISTRIBUTION OF ELECTRICAL ENERGY. Senior year, spring term. Recitations or lectures, four hours. Four credits.

This course is designed to cover station operation and management, methods of power transmission, and systems of distribution. Each student is assigned an important electrical power station, upon which a detailed written report is required. Text, Ferguson's *Elements of Electrical Transmission*.

16.—POWER PLANT DESIGNS AND SPECIFICATIONS. Senior year, spring term. Lectures, one hour; laboratory, six hours. Four credits. Required in the course in electrical engineering.

This work relates to the design and equipment of a modern power plant. Complete specifications for the necessary machinery and apparatus, with drawings showing the plan of the building and the location of the machinery and apparatus, are required.

17.—POWER AND LIGHTING. Senior year, spring term. Class work, three hours; laboratory, two hours. Four credits.

The work is planned to cover briefly the principles of illumination, the proper distribution of lighting units, photometric measurements, and inspection work, as based on the *National Electric Code*.

18.—SEMINAR E-I, E-II, and E-III. Junior year, fall and winter terms, and senior year, winter term, respectively. The first two courses have one hour of class work with one credit; the last is a two-hour course with two credits.

The work of this course is intended to give students of electrical engineering the opportunity to keep informed regarding the latest inventions and research work along the special line which they have chosen. Reviews of current electrical literature are required, and class discussions of articles reviewed are made the basis of the class work.

19.—THESIS. Required in the course in electrical engineering.

The selection of a subject for thesis work, in consultation with the head of the department, is made at the beginning of the winter term. The work is continued during the winter and spring terms. Every opportunity is given the student to work out original ideas as to design or operation.

Mechanical Drawing and Machine Design

Professor SEATON.
Assistant BOWERMAN.

The instruction in this department is intended to familiarize the engineering students with the mechanism of machines, to give them facility in the reading of working drawings, and to ground them thoroughly in the principles of drafting. In several of the courses work is given in the design of simple machine parts. In the mechanical engineering course more extensive work in machine design is given, involving the principles of the applied mechanics. Instruction and practice are also given in blue-printing and other copying processes.

COURSES IN MECHANICAL DRAWING AND MACHINE DESIGN

1.—MECHANICAL DRAWING I. Sophomore year, fall term. Lectures and recitations, one hour; drafting-room practice, two hours. Two credits. Required in the courses in civil engineering, electrical engineering, and mechanical engineering. Prerequisite: Descriptive Geometry II.

The course includes the use and care of drawing instruments, with simple exercises in making working drawings from given plates. Special attention is given to the arrangement of views to secure balance, and to the subject matter and layout of titles and notes. The following supplies are required: triangles, T-square, scale, pencils, pens, ink, erasers, thumb tacks, drawing paper, and a set of drawing instruments. Students are advised not to purchase these supplies until after consulting with the instructor. Text, French's *Engineering Drawing*.

2.—MECHANICAL DRAWING II. Sophomore year, winter term. Lectures and recitation, one hour; drafting-room practice, four hours. Three credits. Required in the courses in civil, electrical, and mechanical engineering. Prerequisites: Mechanical Drawing I; Descriptive Geometry III.

Free-hand sketches are made from simple machine parts, followed by complete working drawings from these sketches without further reference to the objects. Special emphasis is laid upon the proper selection of views to present the necessary information in convenient form, and to give the proper dimensioning of the drawings. Text, French's *Engineering Drawing*.

3.—KINEMATICS I. Sophomore year, spring term. Lectures and recitations, four hours. Four credits. Required in all courses in the Division of Mechanic Arts. Prerequisites: Plane Trigonometry; Descriptive Geometry II.

An analysis of the motions and forms of the parts of machines is considered in this course. Among the subjects discussed are: bearings, screws, worm and wheel, rolling cylinders, cones, and other surfaces; belts, cords and chains, levers, cams, and linkwork, with the velocity and motion diagrams; quick returns, straight-line motions, and other special forms of linkages; conjugate curves for gear teeth, cycloidal and involute systems of gearing, spur annular and bevel gears, and special forms of gearing. The solution of a large number of graphical and mathematical problems is required in this course. Text, Schwamb and Merrill's *Elements of Mechanism*.

4.—MECHANICAL DRAWING III. Sophomore year, spring term. Drafting-room practice, six hours. Three credits. Required in the courses in

electrical, and mechanical engineering. Prerequisite: Mechanical Drawing II. Kinematics I must accompany or precede this course.

The work in the first part of the term is a continuation of that given in Mechanical Drawing II. This is followed by the designing of cams, gears, and quick returns to fulfill specified conditions. Center-line drawings are first made, embodying the solution of the problem, and upon these are built working drawings of machine parts. An effort is made to follow standard practice in the design of those details usually determined by empirical methods. Velocity diagrams are drawn for the cams and quick returns. Gear teeth are accurately rolled and drawn from templates prepared by the student.

5.—KINEMATICS II. Junior year, fall term. Lectures and recitations, two hours; drafting-room practice, two hours. Three credits. Required in the course in mechanical engineering. Prerequisites: Kinematics I; Mechanical Drawing III.

This course is a continuation of Kinematics I, consisting of a consideration of the following subjects: mechanisms for producing intermittent motion, such as clicks, ratchets, and escapements; wheels in trains; and combinations of mechanisms. The drafting-room practice is a continuation of the work given in Mechanical Drawing III, and consists of the application of the classroom instruction to some simple problems in the design of mechanisms. Text, Schwamb and Merrill's *Elements of Mechanism*.

6.—MECHANICAL DRAWING IV. Junior year, winter term. Drafting-room practice, four hours. Two credits. Required in the course in mechanical engineering. Prerequisite: Steam Engineering I. Applied Mechanics II must accompany or precede this course.

This includes the solution of a problem on the slide valve by the Zeuner diagram, followed by the design, mostly by empirical methods, of the cylinder, piston, steam chest, and valve of a steam engine. Kent's *Mechanical Engineer's Pocketbook* is extensively used for reference, and each student is expected to have a copy.

7.—MECHANICAL DRAWING V. Junior year, spring term. Drafting-room practice, four hours. Two credits. Required in the course in mechanical engineering. Prerequisites: Mechanical Drawing III and Kinematics II.

This course covers the making of detailed working drawings from free-hand assembly sketches, and of assembly drawings from details.

8.—MACHINE DESIGN I. Senior year, fall term. Lecture and recitation, one hour; drafting-room practice, four hours. Three credits. Required in the course in mechanical engineering. Prerequisites: Applied Mechanics IV. Steam Engineering IV must accompany or precede this course.

This course includes a careful study of the fundamentals of machine design. The energy and force problems, and the straining action in machine elements, are considered, together with the design of these elements to meet specified conditions as to strength and rigidity.

The drafting-room practice consists of the solution of several problems in design based on the principles already learned in the applied mechanics. In the latter part of the term work is begun on the design of a steam boiler. Calculations are made to determine the dimensions of all parts, and working drawings are made. Text, Kimball and Barr's *Elements of Machine Design*.

9.—MACHINE DESIGN II. Senior year, winter term. Drafting-room practice, four hours. Two credits. Required in the course in mechanical engineering. Prerequisite: Machine Design I.

This is a continuation of the work of the fall term. The design of the steam boiler is completed, and work is begun on the design of a power shear.

10.—MACHINE DESIGN III. Senior year, spring term. Drafting-room practice, four hours. Two credits. Required in the course in mechanical engineering. Prerequisite: Machine Design II.

This is a continuation of the work of the winter term, covering the completion of the design of the power shear.

Power and Experimental Engineering

Professor MCCORMICK.
Assistant ORR.
Assistant JOHNSON.
Assistant SANDERS.

The work given in this department is intended to supplement the courses in applied mechanics, hydraulics, machine design, and steam and gas engineering. The instructor undertakes to show the application of theoretical principles to actual problems, to teach the methods of conducting commercial tests, and to encourage original experimental investigation. The student is required to present a complete report of each experiment performed, which includes such charts, tables and conclusions as would be embodied in a report given by a consulting engineer in commercial work.

In addition to the equipment installed especially for experimental purposes, all of the heat, power, ventilating and pumping equipment of the College subserves the further purpose of experimental work. There are available for boiler tests three 125-horsepower high-pressure boilers, identical in construction and setting, but equipped with different mechanical stokers, one having an underfeed stoker, another a chain grate, and a third a rocking grate. Besides the three high-pressure boilers, there are eight low-pressure boilers equipped with underfeed stokers and so arranged that they can be run independently or in batteries. These boilers have full equipment of auxiliaries, and, in connection with the engines and dynamos, make possible a wide range of experimental work.

The laboratories contain five steam engines, ranging from 6 horsepower to 100 horsepower, and a 300-horsepower DeLaval steam turbine. One of these engines and the turbine are direct-connected to generators. Another of the engines is belted to a generator, while the remainder are run in connection with absorption brakes.

The department owns two modern traction engines, which are occasionally used for testing purposes. Several types of gas engines are in the laboratories, ranging from 3 to 10 horsepower, and in addition a four-cycle gasoline tractor which will develop 35 horsepower. A small compressed-air plant is installed in the laboratories, and consists of an eight-by-eight Ingersoll-Sargent air compressor, driven by an electric motor, driving in turn a small motor, the power of which is absorbed by a brake. For experimental work with fans and draft, the College has eight fans, of which two are belt driven, four are direct-connected to motors, and two are driven by a steam engine.

There are two 100-horsepower producer gas plants, which are used for experimental purposes.

The hydraulic laboratory contains two hydraulic pits of 23,000 gallons capacity each, a system of piping for obtaining different heads of water,

two centrifugal pumps, two hydraulic rams, one Pelton water wheel, one Venturi water meter, one water motor, one Viking pump, two deep-well pumps, and many pieces of auxiliary apparatus, such as different kinds of weirs, scales, tanks, pressure, differential and hook gauges, thermometers, manometers, etc. The power for these machines is furnished by a 13-horsepower electric motor and a 12-horsepower oil engine.

In the strength of material laboratory there is a 100,000-pound Riehle universal testing machine, upon which transverse specimens six feet in length can be tested. In connection with this machine there is a beam-testing apparatus, built at the College, which will test beams or concrete slabs up to two feet in width and fourteen feet in length. This apparatus can also be arranged to test cantilevers up to sixteen inches in width and twelve feet in length. There is a full equipment of cement- and concrete-testing machinery and apparatus. Part of this equipment has been built at the College, and is on a scale large enough to accommodate any specimens that can be handled in a laboratory.

The roads materials laboratory contains a rattler for testing paving brick. For the testing of macadam rock there is a ball mill, abrasion machine, briquette forms, two impact machines, hardness-testing machine, diamond edge saw, core drill, and such auxiliary apparatus as scales, ovens, etc. There is also a torsion-testing machine, built at the College, which will handle specimens from $\frac{3}{4}$ to $2\frac{1}{2}$ inches in diameter and up to eighteen feet in length. This machine can also be used to test the strength of gearing.

The transmission laboratory contains transmission, absorption and traction dynamometers, a 1200-pound freight elevator, oil and bearing testing machine, large platform scales, screw and hydraulic jacks, differential hoists, and many other small instruments for taking weights and measurements. An automobile testing plant is now under construction.

COURSES IN POWER AND EXPERIMENTAL ENGINEERING

1.—APPLIED MECHANICS I LABORATORY. Junior year, fall term. Two hours a week. One credit. Required in all of the engineering courses.

This course covers laboratory instruction in subjects as follows: The use and determination of accuracy of micrometers and planimeters, calibration of gauges, thermometers, indicator springs, dynamometers, platform scales, and tachometers; efficiency tests on hoists and jacks. Reference book recommended: Carpenter and Diederich's *Experimental Engineering*. Prerequisite: Applied Mechanics I must accompany or precede this course.

2.—APPLIED MECHANICS II-CE (AND II-M) LABORATORY. Junior year, winter term. Four hours, two credits; and two hours, one credit, respectively. Required in all engineering courses.

This course covers the following experiments: compression tests of various woods and metals; tensile tests with cast iron, wrought iron, and steel; transverse tests of various woods and metals under concentrated and eccentric loads; tests of welds, hooks, and chains; preparation of standard tensile and compression cement specimens; the use of cement-testing machines. The amount and nature of the work is varied to some extent in the different courses, on account of the varying amounts of time devoted to the subject. Prerequisites: Applied Mechanics I Laboratory. Applied Mechanics II must accompany or precede this course.

3.—STEAM ENGINEERING II LABORATORY. Junior year, winter term. Two hours a week. One credit. For students in the courses of mechanical engineering. Taken in connection with Steam Engineering II.

This course begins with the study of the construction and care of steam engines, steam turbines, and internal-combustion engines. This is followed by valve-setting and by indicator practice on steam and gas engines. Prerequisites: Applied Mechanics I Laboratory; Steam Engineering I.

4.—APPLIED MECHANICS III LABORATORY. Junior year, spring term. Two hours a week. One credit. For students in mechanical and civil engineering.

This course includes tests of cements, sands, and concretes, such as the determination of fineness, soundness, time of set, tensile, transverse and compressive strengths, proper proportioning and mixing of concretes; the use of cement mixers and cement-block machines, and the efficiency of the various reinforcing materials; abrasion, freezing, absorption, compression and transverse tests of brick and stone; torsion tests on metals; and tests of road materials. Prerequisite: Applied Mechanics II must accompany or precede this course.

5.—HYDRAULICS LABORATORY. Junior year, spring term. Two hours a week. One credit. Required in all engineering courses.

This course includes tests to determine the coefficients of weirs, orifices, tubes, and pipes; use and calibration of water meters. Test to determine loss of head in pipes due to various causes, and the measurement of water in open streams. Prerequisite: Applied Mechanics I Laboratory. Hydraulics must accompany or precede this course.

6.—STEAM ENGINEERING III LABORATORY. Junior year, spring term. Two hours a week. One credit. For students in mechanical engineering. Taken in connection with Steam Engineering III.

This is a continuation of the work given in Steam Engineering II Laboratory, and includes testing of steam engines, steam turbines, and gas engines; the use of several different kinds of steam calorimeters and injectors; tests of air compressors and air motors. Prerequisite: Steam Engineering II.

7.—APPLIED MECHANICS IV LABORATORY. Senior year, fall term. Two hours a week. One credit. For students in mechanical engineering. Taken in connection with Applied Mechanics IV.

This course includes tests of bearings and lubricants; impact tests, foundations for machines; road tests with traction dynamometer; measurements of power in transmission, and of slippage of belts. Prerequisite: Applied Mechanics III.

8.—HYDRAULIC MACHINERY LABORATORY. Senior year, fall term. Two hours a week. One credit. For students in mechanical, electrical and civil engineering. Taken in connection with Hydraulic Machinery.

This course includes tests on water wheels, water motors, rams, and pumps. Prerequisite: Hydraulics Laboratory.

9.—STEAM ENGINEERING IV LABORATORY. Senior year, fall term. Two hours a week. One credit. For students in mechanical engineering. Taken in connection with Steam Engineering IV.

This term's work includes the handling and care of boilers, stokers, and pumps; boiler testing; condenser testing; pump and fan testing; analysis of solid fuels and of flue gases. Prerequisite: Steam Engineering III.

10.—STEAM AND GAS ENGINEERING E-I LABORATORY. Senior year, fall term. Two hours a week. One credit. For students in electrical engineering. Taken in connection with Steam and Gas Engineering E-I.

Construction and care of steam engines, steam turbines, internal-combustion engines; indicator practice and valve setting; analysis of liquid and gaseous fuels by means of the Junkers calorimeter, and the use of different kinds of steam calorimeters, are included in this course. Prerequisite: Applied Mechanics I Laboratory.

11.—STEAM AND GAS ENGINEERING C LABORATORY. Senior year, fall term. Two hours a week. One credit. For students in civil engineering. Taken in connection with Steam and Gas Engineering C.

This course includes construction and care of steam and internal-combustion engines; indicator practice and valve setting; use of steam calorimeters; tests of steam and gas engines; air compressor and compressed-air motor tests. Prerequisite: Applied Mechanics I Laboratory.

12.—FACTORY ENGINEERING. Senior year, winter term. Lectures and recitations, two hours; drafting-room work, four hours. Four credits. For students in mechanical engineering.

This course considers the selection of a locality and site for shops and manufacturing establishments; the grouping and design of the buildings, including the study of slow-burning and fire-proof construction; systems of illumination; equipment for the different departments; the methods of handling the raw material, from the point of its receipt through the several departments to the completion of the finished product, with the least amount of doubling back; methods of manufacturing. Each student makes a complete design of a factory or shop, outlining the method of organization, system of cost accounting, marketing, etc. Text, Kent's *Mechanical Engineer's Pocketbook*. Prerequisites: Applied Mechanics III; Business Organization.

13.—GAS ENGINEERING LABORATORY. Senior year, winter term. Two hours a week. One credit. For students in mechanical engineering. Taken in connection with Gas Engineering.

This course includes the handling and care of gas producers; proximate and ultimate analyses of liquid and gaseous fuels; determination of the boiling point of kerosene, gasoline, and alcohol, and the variation of same with the specific gravity of the fuels; proportions for explosive mixtures; pressure due to explosion; experimental determinations of conditions affecting the mean effective pressure of internal-combustion engines; comparative values of gasoline, kerosene, and alcohol, in the same internal-combustion engine; effect of jacket temperature on thermal efficiency; complete producer and gas-engine tests. Prerequisite: Steam Engineering IV.

14.—STEAM AND GAS ENGINEERING E-II LABORATORY. Senior year, winter term. Two hours a week. One credit. For students in electrical engineering. Taken in connection with Steam and Gas Engineering E-II.

This course includes: the testing of engines, steam turbines, and internal-combustion engines; use and calibration of injectors; tests of condensers, pumps, and fans; and tests of air compressors and air motors. Prerequisite: Steam and Gas Engineering E-I.

15.—HEATING AND VENTILATION. Senior year, spring term. Lectures and recitations, two hours; laboratory and drafting-room work, six hours. Five credits. For students in mechanical engineering.

This course is planned to acquaint the student with the fundamental principles of the subject, and the following topics are considered: direct and indirect systems; hot-water, hot-air, live-steam and exhaust-steam systems of heating; points to be considered in the design of heating systems for shops, factories, power plants, schools, churches, and dwellings; sizes of air ducts, radiators, and heating surface required for the various systems; fan computation and testing; vacuum system; reducing valves, air valves, water expansion tanks, thermostats; efficiencies of

various heating systems, and analysis of the systems in use at the College; the design of a system of heating for a special case, with specifications and bill of material. Textbook to be selected. Prerequisites: Steam Engineering II, III, and IV.

16.—POWER PLANT ENGINEERING. Senior year, spring term. Lecture and recitation, one hour; laboratory and drafting-room work, four hours. Five credits. For students in mechanical engineering.

This course consists of drafting-room work, power-plant tests, and such lectures, recitations and inspection trips as may be needed to make the course practical and effective. The work includes the laying out of a complete plant for assigned units, and the making of such drawings as are necessary to show the location of boilers, stokers, engines, auxiliaries, piping, chimneys, fans, coal-handling machinery, etc. The student makes a careful study of load conditions, location of plant, and other details. No attempt is made to design apparatus, but standard makes are selected and the student shows in detail the methods of assembling and installing all the machinery and equipment used. The same problem is assigned to the entire class, but during any one term there will be designs of several plants under way. The usual features of each design are taken up before the entire class, so that each student derives benefit from his neighbor's work as well as from his own. Textbook to be selected. Prerequisites: Steam Engineering IV, Applied Mechanics IV, Hydraulic Machinery, and Gas Engineering.

17.—GAS ENGINES. Elective, winter term. Lecture, one hour; laboratory, four hours. Three credits.

This course is designed to teach the operation, care and repair of small stationary gas engines. No prerequisite.

18.—TRACTION ENGINES. Elective. Laboratory, four hours. Two credits.

A course in the operation of gas and steam engines and in traction engineering.

Printing

Acting Superintendent RODELL.
Assistant ALLEN.

The Department of Printing had its inception when *The Kansas Industrialist* was established, in 1875. The demands made upon the department have necessitated a gradual increase in equipment and facilities, until at present it occupies the entire first floor and basement of Kedzie Hall. In addition to printing and mailing *The Kansas Industrialist* each week during the College year, the large amount of general printing for the numerous departments of the College furnishes a wide range of work and keeps the plant in constant operation during the entire twelve months.

From the beginning, printing-trade practice has been offered to students, but more recently definite subjects in the art and practice of printing have been presented in systematic and orderly arrangement. In its course the department endeavors to impart a practical knowledge of the principles of typography, and in its execution of general printing to turn out as nearly perfect a product as the time allotted and the facilities of the plant will permit.

COMPOSING ROOM. The equipment consists of ten racks of body type, two dumps, galley racks, proof press, ten cabinets of display type, five imposing stones, two lead and slug racks, make-up rack, ink stones, galleys, chases, and other accessories. A linotype machine will be added to the composing-room equipment.

FOLDING AND STOCK ROOM. The equipment consists of tables for hand folding, two wire-stitching machines, one 32-inch power paper cutter, one 26-inch hand cutter, one interchangeable perforating, punching, and round-cornering machine, racks for storing stock, and other necessary appliances.

PRESSROOM. The equipment consists of one two-revolution cylinder press, one drum-cylinder press, three platen presses, one imposing stone, drying racks, tables, trucks, and other accessories. All machines requiring power are driven by individual electric motors.

COURSE IN PRINTING.

1.—**COMPOSITION I-J.** Sophomore year, fall term. Laboratory, four hours. Two credits. Required in the course in industrial journalism.

This course gives practical training in the setting of type from properly edited newspaper copy.

2.—**COMPOSITION II-J.** Sophomore year, winter term. Laboratory, four hours. Two credits. Required in the course in industrial journalism. Prerequisite: Composition I-J.

This is a continuation of Composition I-J, with additional training in setting type to book measures, setting display headings, and gaining a general knowledge of the make-up of newspaper forms.

3.—**NEWS COMPOSITION I.** Elective, fall term. Laboratory, four hours. Two credits.

Practical training in the setting of type from newspaper copy, with a proper reference to its application in the work to follow.

4.—**NEWS COMPOSITION II.** Elective, winter term. Laboratory, six hours. Three credits. Prerequisite: News Composition I.

This course is a continuation of News Composition I.

5.—**BOOK COMPOSITION.** Elective, spring term. Laboratory, six hours. Three credits. Prerequisite: News Composition I and II.

Practical training in the setting of type in the regulation and special book measures; an extension of news composition into a more intricate field.

6.—**DISPLAY COMPOSITION I.** Elective, fall term. Laboratory, six hours. Three credits. Prerequisite: Book Composition and Distribution I.

The course comprises a study of the art of reproducing "copy" by means of a suitable selection and harmonious grouping of type faces, rules, and ornaments, in a manner that will present the thought to be conveyed in an attractive and efficient manner. The practice work will be largely devoted to advertisement composition.

7.—**DISPLAY COMPOSITION II.** Elective, winter term. Laboratory, six hours. Three credits. Prerequisite: Display Composition I.

This is a continuation of Display Composition I, the practical work to include all manner of composition applicable to general and special commercial printing. The originality of the student will be aided and supplemented by the study of the latest books and magazines on printing art.

8.—DISPLAY COMPOSITION III. Elective, spring term. Laboratory, six hours. Three credits. Prerequisites: Display Composition I and II. This course is a continuation of Display Composition II.

9.—TABLE COMPOSITION. Elective, winter term. Laboratory, four hours. Two credits. Prerequisite: Display Composition I.

Training is given in the composition of various styles of tabular work, with instruction in the calculation of the widths and lengths of headings and columns used in construction.

10.—DISTRIBUTION I. Elective, spring term. Laboratory, two hours. One credit. Prerequisites: News Composition I and II.

Instruction and training are given in the proper distribution of straight matter.

11.—DISTRIBUTION II. Elective, fall term. Laboratory, four hours. Two credits. Prerequisite: Distribution I.

This course is a continuation of Distribution I, with additional training in distributing display matter.

12.—CORRECTING PROOFS. Elective, fall term. Laboratory, two hours. One credit. Prerequisites: News Composition I and II, Book Composition, and Distribution I.

Practice is had in correcting galleys of straight matter. This course familiarizes the student with the marks used by the proofreader to designate errors and alterations.

13.—EDITING COPY. Elective, fall term. Laboratory, two hours. One credit. Prerequisite: Proofreading.

Instruction and practice in the marking of copy to conform to office style in capitalization, punctuation, abbreviations, etc., and to secure general uniformity, so that the compositor may proceed to set the same in type with a minimum waste of time and with less liability of alteration and correction on the proof.

14.—STOCK ROOM PRACTICE I. Elective, winter term. Laboratory, two hours. One credit.

Study of the texture, weights, sizes and prices of various papers; practical work in paper cutting, trimming, tabbing, stapling, soft binding, and the operation of stockroom machinery.

15.—STOCK ROOM PRACTICE II. Elective, spring term. Laboratory, two hours. One credit. Prerequisite: Stock Room Practice I.

This course is a continuation of Stockroom Practice I.

16.—IMPOSITION OF FORMS. Elective, spring term. Laboratory, four hours. Two credits. Prerequisite: Display Composition III.

This course comprises theory and practice in preparing type forms for the pressroom; the study of make-up of newspapers, books, pamphlets, etc.; the assembling of pages into forms, with proper margins, and the locking up and alignment of same.

17.—PLATEN PRESSWORK I. Elective, fall term. Laboratory, six hours. Three credits.

Practical training is given in the operation and care of platen presses, care of rollers, use of inks, etc.; study of platen-press methods.

18.—PLATEN PRESSWORK II. Junior year, winter term. Class work, one hour. Laboratory, eight hours. Five credits. Prerequisite: Platen Presswork I.

A continuation of platen presswork, with the addition of the study of color harmony and practice in color presswork.

19.—PLATEN PRESSWORK III. Elective, spring term. Laboratory, six hours. Three credits. Prerequisite: Platen Presswork II.

This course is a continuation of Platen Presswork II.

20.—PROOFREADING. Elective, spring term. Laboratory, two hours. One credit.

This is a practical course in the reading of proofs for typographical errors, mistakes in spelling and punctuation, transgressions of the compositor in departing from copy, and marking the same for correction. Reference to the best authorities on method and style will be required.

21.—MACHINE COMPOSITION I. Elective, fall term. Laboratory, six hours. Three credits. Prerequisite: All composing-room work.

Instruction is given in the care and operation of a standard linotype machine, the composition to consist of straight news and book matter.

22.—MACHINE COMPOSITION II. Elective, winter term. Laboratory, six hours. Three credits. Prerequisite: Machine Composition I.

This is a continuation of the work offered in Machine Composition I, but extended into a more intricate field of composition, such as tabular work, display headings, etc.; study of machine composition methods.

23.—MACHINE COMPOSITION III. Elective, spring term. Laboratory, six hours. Three credits. Prerequisite: Machine Composition I and II.

This course is a continuation of Machine Composition II.

24.—CYLINDER PRESSWORK I. Elective, fall term. Laboratory, eight hours. Four credits. Prerequisites: Platen Presswork I, II, and III.

Practical training is given in the care and operation of two-revolution and drum-cylinder presses; study of cylinder-press methods.

25.—CYLINDER PRESSWORK II. Elective, winter term. Laboratory, four hours. Two credits. Prerequisite: Cylinder Presswork I.

This course is a continuation of Cylinder Presswork I.

26.—COST FINDING. Elective, fall term. Class work, one hour. One credit.

Various systems for ascertaining the cost of production in printing plants are studied, with special reference to its application in estimating and in business management.

27.—ESTIMATING. Elective, winter term. Laboratory, two hours. One credit. Prerequisite: Cost Finding.

Practical instruction is given in the methods of figuring the different items of expense that make up the total cost of the finished product.

28.—METHODS AND MANAGEMENT. Elective, spring term. Class work, two hours. Two credits.

Modern methods in the business management of a printing establishment and in efficient operation of the physical plant are the subjects studied in this course.

29.—PRINTING PROCESSES. Elective, spring term. Class work, four hours. Four credits.

This course comprises a study of the rise and progress of printing, of type founding, stereotyping, electrotyping, engraving, lithography, etc., and of the recent inventions relating to these processes.

Shop Methods and Practice

Assistant Professor CARLSON.
Instructor HOUSE.
Instructor HOLLAR.
Instructor HAYES.
Instructor GRANT.
Assistant YOST.
Assistant PARKER.
Assistant IREY.
Assistant _____.
Assistant _____.

The work in the shops is planned to meet the needs of three classes of students: (1) those in the courses in agriculture who expect to use the skill gained in the shops in their after work on the farm; (2) those in the manual-training option of the course in general science who need to secure a sufficient knowledge of the principles underlying shop work, and sufficient skill in the performance of various operations, to be able to instruct others; (3) those in the courses in engineering whose need is to secure a thorough knowledge of the methods of performing various kinds of shop work; of the machines best suited for the different purposes; of the amount of work that may be expected of the different machines and from the workmen under different conditions. With these students it is a secondary consideration to secure skill in the performance of the various operations. In order to secure these different results, it is considered desirable to separate these students, especially after the first few terms of elementary work.

The equipment of the department is set forth to a certain extent below.

WOOD SHOP. This room is 40 x 90 feet; it contains two hundred and twenty separate sets of tools, and benches for forty-four students in each class.

PATTERN SHOP. This room is 45 x 81 feet, and contains sixteen ten-inch by four-and-one-half-foot wood-turning lathes and one eighteen-inch by twelve-foot J. A. Fay & Co. pattern makers' lathe, fully equipped with tools and chucks; eight pattern makers' double benches, equipped with rapid acting vises and a complete set of tools.

WOODWORKING MACHINERY ROOM. This room is 35 x 42 feet, and contains one Dietzwell wood planer, one Cordesman Meyer friezer, one thirty-four-inch band saw, one Beach jig saw, one Fay combination circular saw, one Fay & Egan power mortiser, one Fay & Egan sandpapering machine, one K. S. A. C. sensitive drill, one Seneca Falls foot mortiser, besides the necessary grindstones and work benches.

MACHINE SHOP. This room is 40 x 116 feet, and contains thirteen engine lathes, as follows: One fourteen-inch Hendey-Norton lathe, two fourteen-inch Flather lathes, one thirteen-inch Lodge & Davis lathe, one sixteen-inch Lodge & Shipley combination engine and turret lathe, two fourteen-inch Reed lathes, five fourteen-inch K. S. A. C. lathes, and one twenty-eight-inch by twenty-foot American lathe equipped with block to raise it to sixty-inch swing, one K. S. A. C. speed lathe, one Brown & Sharp No. 2 universal milling machine, one K. S. A. C. (Hendey-Norton

patterns) shaper, one K. S. A. C. (Pratt & Whitney patterns) shaper, one Gray twenty-six-inch by six-foot planer, one Niles fifty-one-inch vertical turning and boring mill, one Baker Bros. key seater, one Barnes thirty-four-inch self-feed drill press, one Rogers twelve-inch sensitive drill press, two K. S. A. C. twelve-inch sensitive drill presses, one K. S. A. C. (Bemis Miller's patterns) twenty-inch double-traverse quick-return shaper, two Morse & Dexter valve reseating machines, one Walker universal grinder, one K. S. A. C. special drill grinder, one power hack saw, one Emerson direct-connected motor polishing machine, one bolt and pipe machine taking pipe up to two inches, one pipe machine taking pipe up to eight inches, benches and tools for fifty students, and a tool room completely stocked with the finest modern tools.

BLACKSMITH SHOP. This room is 50 x 100 feet, and is equipped with thirty-three Sturtevant down-draft forges for students' use and two large special Sturtevant forges for general use. Each forge has anvil and complete set of forging tools, and is supplied with forced draft and power exhaust. In addition to the general tools for a fully equipped blacksmith shop, there is also installed a drill press, punch and shear, emery grinder, one tire bender, one tire shrinker, power cold saw, and a number of pieces of special apparatus built by the department.

IRON FOUNDRY. This room is 27 x 100 feet. It is equipped with a one-and-one-half-ton Colliau cupola, one-and-one-half-ton K. S. A. C. steel crane, core oven five by six by seven feet (arranged so that it can be heated with either coke or gas), one car, track and turntable, one two-by-three-foot K. S. A. C. rumbler, one K. S. A. C. emery grinder, one K. S. A. C. molding machine, an exceptionally large number of flasks, both wood and iron, ladles, etc.

BRASS FOUNDRY. This room is 24 x 34 feet. It is equipped with one twenty-one by thirty-six-inch brass furnace, crucibles, flasks, molding tubs, benches, cases, racks, and all necessary tools for bench and floor molding.

AMPHITHEATER. This room is 54 x 54½ feet. It is adjacent to the blacksmith shop and iron and brass foundries, and is equipped with forge, anvil and forge tools, bench, molding trough and molding tools, blackboard, etc., for lectures and demonstration work.

LOCKER ROOM. This room is 36 x 40 feet. It is conveniently located, and is equipped with 244 special metal lockers for the use of students taking work in the machine shop, blacksmith shop, foundry and engineering laboratory. A portion of this is made a separate locker-room and bathroom for the use of the shop foreman, and contains seven metal lockers.

COURSES IN SHOP METHODS AND PRACTICE

1.—**BLACKSMITHING I.** Freshman year, fall term. Lecture, one hour; shop work, four hours. Three credits. Required of students in all of the engineering courses.

This is a course in the forging of iron, and is designed to teach the principles and operations of drawing, bending, upsetting, welding, twisting, splitting, and punching. Tools required: A two-foot rule and a pair of five-inch outside calipers.

2.—BLACKSMITHING II. Freshman year, winter term. Lecture, one hour; shop work, four hours. Three credits. Required of all students in the Division of Mechanic Arts. Prerequisite: Blacksmithing I.

Advanced work in the forging of iron and in the manufacture of steel tools. Instruction is given in hardening, tempering, case-hardening and annealing. A study is made of the different methods of manufacturing iron and steel, the composition and heat treatment of steel, and commercial methods of hardening and tempering steel tools. Tools required: Same as Blacksmithing I.

3.—FOUNDRY. Freshman year, spring term. Lecture, one hour; shop work, four hours. Three credits. Required of all students in the Division of Mechanic Arts.

Practice is given in floor, bench and machine molding, in core making, and in casting in iron, copper, brass, and special alloys. A study is also made of modern foundry construction, equipment, materials, and methods.

4.—PATTERN MAKING. Sophomore year, fall term. Lecture, one hour; shop work, four hours. Three credits. Required in the courses in electrical, and mechanical engineering. Prerequisite: Foundry.

Sufficient work is given in wood turning to enable the student to become familiar with turning lathes and tools, so that he can use the lathes when necessary in pattern construction. The course in pattern making comprises a series of exercises embodying the principles governing pattern construction in making plain and split patterns, including core prints and core boxes, after which practical patterns are made of machines and machine parts.

6.—MACHINE SHOP I. Sophomore year, winter term. Lectures, one hour; shop work, four hours. Three credits. Required in the course in electrical and mechanical engineering. Prerequisite: Foundry.

Practice is given in chipping, filing, shaper and planer work, scraping, drilling, and the cutting of right hand, left hand, and double threads, and nurling on the lathe. Tools required: A four-inch scale or (B and S) slide caliper, a nine-inch combination set with No. 7 graduation, one pair five-inch outside calipers, one pair of five-inch inside calipers, one center drill, one center gage (B and S), and one pair of three-inch dividers.

7.—MACHINE SHOP II. Sophomore year, spring term. Lectures, one hour; shop work, four hours. Three credits. Required in the course in electrical and mechanical engineering. Prerequisite: Machine Shop I.

This course consists of progressive problems in turning and calipering, boring, reaming and taper turning and threading on the lathe, exercises in chucking, the use of forming tools, practice on the key-seating machine, and the making of a spur gear on the milling machine. A study is also made of cutting edges and tool adjustments best suited to the different metals, together with a study of cutting speeds and feeds.

8.—MACHINE SHOP III. Junior year, fall term. Lectures, one hour; shop work, four hours. Three credits. Required in the course in electrical and mechanical engineering. Prerequisite: Machine Shop II.

This course takes up work on the turret lathe, boring mill. Practical work is also given with jigs, templets, and a study made of the rapid production of duplicate parts, belts, lacings, and methods of belt connections, compound and differential indexing and the cutting of spiral gears on the milling machine.

9.—WOODWORK III-G. Junior year, fall term. Lectures and recitations, two hours; shop work, eight hours. Six credits. Elective in the course in general science.

A course is given in woodworking suitable for use in the upper grammar and high-school grades. Each student completes a set of exercises

suitable for those grades. Models showing progressive steps are made for the purpose of illustrating the proper methods of procedure in working out the different exercises. A study is made of the selection and cost of the equipment and materials used in this work.

10.—**MACHINE SHOP IV.** Junior year, winter term. Lecture, one hour; shop work, four hours. Three credits. Required in the course in mechanical engineering. Prerequisite: Machine Shop III.

The time of this course is devoted to the construction of complete machines and machine parts, from drawings and blue-prints. A study will be made of the different machine tools from assigned catalogue work, with regard to the economical and efficient production of different classes of product, and a study of the arrangement of machines in the shop.

11.—**WOODWORK IV-G.** Junior year, winter term. Lectures and recitations, one hour; shop work, four hours. Three credits. Elective in the course in general science. Prerequisite: Woodwork III-G.

This is a continuation of Woodwork III-G, with a study of cabinet construction best adapted to high-school grades. The work of this term includes a course in wood carving designed to develop skill in using carving tools, in sinking backgrounds, and in modeling curved surfaces. The course includes a study of the proper application of carving in ornamenting articles of use.

12.—**WOOD TURNING G.** Junior year, winter term. Lectures and recitations, one hour; shop work, four hours. Elective in the course in general science. Prerequisite: Woodwork III-G.

Exercises are first given in turning cylinders, cones, beads, convex and concave curves, which involve the use of different wood-turning tools. The course involves turning between centers, on faceplates, and by means of hollow chucks. Some of the articles made are tool handles, dumb-bells, napkin rings, towel rings, bowls, typical vase forms, cups, goblets, etc. Tools required: One two-foot rule, one pair of three-inch dividers, one pair of five-inch outside calipers, one pair of five-inch inside calipers.

13.—**MACHINE SHOP V.** Junior year, spring term. Shop work supplemented by lectures, four hours. Two credits. Required in the course in mechanical engineering. Prerequisite: Machine Shop IV.

This course is a continuation of Machine Shop IV, with practice in the making of taps, reamers, twist drills, dies and tool-making work.

16.—**MACHINE SHOP VI.** Senior year, winter term. Shop work supplemented by lectures, four hours. Two credits. Required in the course in mechanical engineering. Prerequisite: Machine Shop V.

This is a continuation of Machine Shop V, with practice in the grinding of reamers, and milling cutters, and general tool work.

18.—**BLACKSMITHING III-G.** Senior year, winter term. Lectures and recitations, one hour; shop work, four hours. Three credits. Elective in the course in general science. Prerequisite: Blacksmithing II.

Special drill in forge work is given in order to impart skill in the different operations. Progressive steps of different exercises are worked out, in order to illustrate the method of their construction. Tools required: A two-foot rule, and a pair of five-inch outside calipers.

19.—**MACHINE SHOP VII.** Senior year, spring term. Shop work, four hours. Two credits. Required in the course in mechanical engineering. Prerequisite: Machine Shop VI and Factory Engineering.

This consists of a course of general machine work, where special emphasis is laid upon the quality and quantity of work done, the idea being to make an analysis of shop operations, dividing it into elements in order to make a time study of each element.

21.—BLACKSMITHING IV-G. Senior year, spring term. Lectures and recitations, one hour; shop work, two hours. Two credits. Elective in the course in general science. Prerequisite: Blacksmithing III-G.

This comprises a study of ornamental forge work in designing and making articles such as jardiniere stands, andirons, hinges, escutcheons, etc. A portion of the time is devoted to hammered metal work. Problems are worked out in copper and brass, which bring into use typical tools and operations in the handling of sheet metal.

22.—MACHINE SHOP III-G. Senior year, spring term. Lectures and recitations, one hour; shop work, four hours. Three credits. Elective in the course in general science. Prerequisite: Machine Shop II.

A course in machine-shop metal working, adapted to the conditions frequently found in high schools, is here completed. A study is made of the selection of machines, tools, and general supplies; the proper arrangement of the shop, the location of shafting, and other shop problems.

Steam and Gas Engineering

Professor POTTER.

The object of the instruction offered in this department is to give to the student the fundamental principles underlying the design, construction, selection, operation and testing of steam boilers, steam engines, and steam turbines; gas producers; gas and petroleum engines; compressed-air and refrigerating machinery; condensers and evaporators. These subjects are developed by thorough courses in engineering thermodynamics and in steam and gas engineering, and are followed in the fourth year by courses in power-plant engineering, in refrigeration, and in heating and ventilation. The classroom instruction of every course consists of lectures and recitations, which are paralleled by work in the drafting room and laboratory, and supplemented by numerous practical problems, trade catalogues, notes, and inspection trips requiring written reports. All reports must not only conform to the best engineering practice, but must also be written in good English. To accomplish this a large part of the written work is sent over to the Department of English Language for criticism and correction in English, after the technical details have been gone over.

1.—STEAM ENGINEERING I. Junior year, fall term. Lectures and recitations, three hours. Three credits. Required in the course in mechanical engineering. Prerequisite: Kinematics I.

Valve gears are the subject of study here. This course takes up the study of the steam-engine mechanism, and includes plain slide valves, double valves, and drop cut-off valves, with special reference to that of the Corliss engine; link motions and radial valve gears as applied to locomotives, automobiles and traction engines; various valve diagrams, including the Zeuner and Bilgram, with applications to the various types of valves; the methods of setting the various valve gears; fundamental details governing the operation and construction of the leading commercial types of steam turbines. Text, Peabody's *Valve Gears*, Heck's *Steam Engine and Turbine*.

2.—STEAM ENGINEERING II. Junior year, winter term. Lectures and recitations, three hours; laboratory, two hours. Four credits. Required in the course in mechanical engineering. Prerequisites: Steam Engineering I, Differential Calculus, and Integral Calculus.

This is a course in engineering thermodynamics. A detailed mathematical study is made of the laws governing the transformation of heat into work; the thermodynamics of gases, saturated and superheated vapors; thermal lines on pressure-volume and entropy temperature coordinates, heat-engine cycles; the application of the properties of vapors to the study of the thermodynamic cycles of steam engines; flow of vapors; steam calorimeters; condensers. Texts, Peabody's *Thermodynamics*, Peabody's *Tables of Steam and Other Vapors*, and Heck's *Steam Engine and Turbine*.

Laboratory.—See "Power and Experimental Engineering."

3.—STEAM ENGINEERING III. Junior year, spring term. Lectures and recitations, three hours; laboratory, two hours. Four credits. Required in the course in mechanical engineering. Prerequisite: Steam Engineering II.

This is a continuation of the work as given in Steam Engineering II. The course includes a study of gas and oil engines; the application of the laws of gases to the thermodynamic cycles of internal-combustion engines, hot-air engines, air compressors, air and vapor refrigerating machines; properties of explosive mixtures for internal-combustion engines; carburetors and vaporizers for liquid fuels; the design of steam nozzles; the thermodynamic design of the reciprocating steam engine and of the impulse and reaction steam turbine; influence of cylinder condensation, reëvaporation, steam jackets, superheating and compounding on economy. Text same as for Steam Engineering II.

Laboratory.—See "Power and Experimental Engineering."

4.—STEAM ENGINEERING IV. Senior year, fall term. Lectures and recitations, three hours; laboratory, two hours. Four credits. Required in the course in mechanical engineering. Prerequisite: Steam Engineering III.

This subject includes a study of the functions, forms and principles of operation of boilers, reciprocating steam engines, and steam turbines; fire-tube, water-tube, marine and locomotive boilers; boiler settings and foundations; methods of staying boilers; boiler accessories; the care of boilers; water purification; smoke prevention; effect of scale and corrosion on economy; boiler inspection; fuels for boilers and analysis of same; theory of combustion; air for combustion; power of boilers; materials for boilers; boiler explosions; strength tests of boilers; evaporative tests of boilers (A. S. M. E. standard methods); boiler design; steam-engine details, and calculations for simple, compound, condensing and noncondensing engines; the jet, surface and barometric condenser; circulating pumps, dry- and wet-air pumps; regulation of engines; steam-turbine details; tests of reciprocating steam engines and steam turbines, and a study of data based on commercial tests. Texts, Peabody and Miller's *Steam Boilers*, Heck's *Steam Engine and Turbine*.

Laboratory.—See "Power and Experimental Engineering."

6.—STEAM AND GAS ENGINEERING E-I. Senior year, fall term. Lectures and recitations, four hours; laboratory, two hours. Five credits. Required in the course in electrical engineering. Prerequisites: Kinematics, Differential Calculus, and Integral Calculus.

This subject considers the elementary principles of thermodynamics as applied to gases, saturated and superheated steam; thermal lines with gases and steam; heat-engine cycles; steam calorimeters; fuels and combustion; steam boilers, boiler auxiliaries; valve gears; governors; steam engines, simple and compound, condensing and noncondensing; the use of steam and entropy tables and of entropy charts; the solutions of problems on the flow of steam, steam nozzles and boiler evaporation. Texts, Allen and Bursley's *Heat Engines*, Marks and Davis' *Steam Tables*.

8.—STEAM AND GAS ENGINEERING C. Senior year, fall term. Lectures and recitations, three hours; laboratory, two hours. Four credits. Required in the course in civil engineering. Prerequisites: Kinematics, Differential and Integral Calculus.

This course includes the study of steam boilers, engines, and turbines; fundamental thermodynamic laws underlying the operation of heat engines; classification of steam engines; valve gears; compound steam engines and condensers; fuels and combustion; construction of fire-tube and water-tube boilers; boiler accessories. The impulse and reaction steam turbine; construction of two- and four-stroke cycle gas engines, using liquid and gaseous fuels; the indicator card as a measure of work and basis for the analysis of operation of engines; methods of testing boilers; steam engines, steam turbines, and internal-combustion engines. Text, Allen and Bursley's *Heat Engines*.

Laboratory.—See "Power and Experimental Engineering."

7.—STEAM AND GAS ENGINEERING E-II. Senior year, winter term. Lectures and recitations, four hours; laboratory, two hours. Five credits. Required in the course in electrical engineering. Prerequisite: Steam and Gas Engineering E-I.

This is a continuation of the work as given in Steam and Gas Engineering E-I. This course treats of the different forms of prime-movers, with special reference to the requirements of the modern electric power plant; steam-engine types, and the variations in the construction of their most important parts; condensers and auxiliaries; the construction and management of fire-tube and water-tube boilers; feed-water heaters and economizers; stokers; feed-water purification; boiler explosions; steam-turbine types, and their adaptability for electrical power generation; methods of testing engines, turbines, and boilers; internal-combustion engines with liquid and gaseous fuels, and the functional and structural details of same; carburetors and vaporizers for liquid fuels, and the gasification of solid fuels by means of gas producers; methods of testing internal-combustion engines; selection of prime-movers for central stations; relative cost, efficiency and durability of the different types. Texts, Allen and Bursley's *Heat Engines*, Mehrten's *Gas Engine Theory and Practice*.

Laboratory.—See "Power and Experimental Engineering."

5.—GAS ENGINEERING. Senior year, winter term. Lectures and recitations, three hours; laboratory, two hours. Four credits. Required in the course in mechanical engineering. Prerequisites: Steam Engineering III; Chemistry III.

This course involves a detailed study of solid, liquid and gaseous fuels for use in internal-combustion engines, as well as the details of construction of engines for the economical burning of the various fuels. Crude petroleum and its distillates; methods of refining as used in America and in Europe; physical tests for petroleum; petroleum as fuel for internal-combustion engines; gaseous fuels; natural gas; gas-manufacturing processes as applied to coal gas, carbureted coal gas, oil gas, water gas, carbureted water gas, wood gas, acetylene gas, blast-furnace gas, and producer gas; the thermal and physical properties of commercial gases; a careful study of the apparatus required in the manufacture of the various commercial gases, including scrubbers, purifiers, and other auxiliaries; gaseous fuels for internal-combustion engines and for heating and lighting purposes; thermochemical analyses; a study of recent investigations on the internal-combustion engine and gas producer, and of the economics of alcohol, crude petroleum, kerosene and gasoline engines, and comparisons with steam prime-movers. Text, Carpenter and Diederich's *Internal Combustion Engines*.

Laboratory.—See "Power and Experimental Engineering."

9.—REFRIGERATION. Senior year, spring term. Lectures and recitations, two hours; laboratory, two hours. Three credits. Required in the courses in mechanical engineering and electrical engineering. Prerequisites: Steam Engineering III, or Steam and Gas Engineering E.

In this subject a study is made of the practical details and of the manipulation of compression and absorption refrigerating systems; the relative equipment, space economy, fuel and water per ton of refrigeration; details of construction and care of compressors, absorbers, analyzers, rectifiers, exchangers, brine pumps, condensers, tanks, coils, expansion valves, and pipe fittings; cam and plate systems of ice making; refrigerating rooms; cold storage; insulation; ammonia, carbonic acid and other systems; cylinder horsepower per ton of refrigeration; commercial refrigerating plants. Text to be selected.

PRINCIPLES OF ENGINEERING. Lectures, one hour. One credit. Required in all courses in the Division of Mechanic Arts.

This new course of lectures is intended to assist the student in selecting the course that he is to follow during the coming three years. These lectures are given by the heads of the different engineering departments, and discuss the fields of work open to graduates of the different courses, and the requirements that are necessary for a graduate to fill in order to handle the work of the various branches of engineering.

Mechanic Arts in the Summer School

The College has been unable to supply from its regular graduates all of the teachers in manual training required by the high schools of the State, and in order to encourage the introduction of manual training and industrial drawing in all grades the College offers summer courses for teachers in manual training, agriculture, and domestic science.

The work in drawing is an elementary course in free-hand and object drawing especially designed to assist teachers in the use of the state text in drawing.

In manual training and shop practice several courses are offered, embracing different grades of work and different materials. One of these is for pupils in the primary grades, and includes weaving, cord work, raffia, reed work and cardboard construction. Other courses deal with woodworking for the grammar grades and for high schools. These include not only a careful study of tools and processes, and practice in important exercises in joinery, but practical cabinet construction, wood turning, wood carving and inlaying, polishing and finishing.

In metal work a course in forging includes practical exercises for high-school work, involving the operations of drawing, upsetting, welding, twisting, splitting and shaping. Sufficient instruction is given in the forging of tool steel to enable one to make and temper many of the tools needed in high-school work. Another course includes bench work and machine-tool work, and familiarizes the student with some of the fundamental operations of a modern machine shop.

A special circular giving further details of this work may be had upon application to the President of the College. See, also, article in this catalogue on the Summer School.

Engineering Fellowships

The Board of Regents has recently established two fellowships in engineering. Each fellowship is two years in duration. The holder is expected to devote eleven months of the year to the work laid out, and receives from the College \$450 annually.

To be eligible for appointment, the applicant must be a graduate of a technical course of a school or college of recognized standing. Preference will be given to those who have had some commercial experience along the lines of research to be followed.

The time will be divided approximately as follows: One-half the time will be devoted to the solution of some research problem; twenty to thirty per cent will be devoted to some problem in design, such problem being selected with a view to producing results of actual value in the near future; the remaining portion of the time will be devoted to assisting in laboratory, drafting room, or shops, as may seem desirable.

Applications for fellowships should be made to the dean of the Division of Mechanic Arts, and should state the lines of work that the applicant particularly desires to follow.

Division of Home Economics

MARY PIERCE VAN ZILE, *Dean.*

The philosophy which long ruled our educational policy has been so modified by research in the sciences and by development of the industries, arts, and professions, that it is now recognized that any perfected educational system must include technical training. It must encourage the student's natural desire for productive work—work in which there is a living connection between theory and practice. These broader views have been accepted by college and university men, and the result is noted in the success attained by combining industrial, technical, and scientific work with the general studies. The result is evidenced in the new courses of study for our young men and women. It is safe to assume that there are now but few educators who are so conservative as not to be in sympathy with the collegiate education in home training which is furnished by courses in home economics.

The courses are designed to fit young women to be home makers and capable women in whatever sphere their life work may be. The training is both specific and general. While it emphasizes primarily the practical and material side of life, it does not stop here. The young women are constantly reminded that life is not drudgery; that technical knowledge and scientific skill, even, fail to include the full meaning of education in its highest sense. They are taught that any training that fails to develop harmoniously body, mind, and spirit is inadequate and incomplete. They are brought face to face with ideals as well as with actualities, and are made to see that, while skillful labor gives dignity to life, grace, refinement, and self-poise are the highest requisites for true service.

The training given is as varied as it is broad. It includes a knowledge of the laws of health, an understanding of the sanitary requirements of the home; the study of values, both absolute and relative, of the various articles (including food) that are used in the home; the wise expenditure of money, time, and energy; the scientific principles underlying the selection and preparation of food; the right care of children; and the ability to secure efficient service from others. Instruction is methodical and thorough, and is suited to the circumstances of the students. Experience shows that such training teaches contentment, industry, order, and cleanliness, and fosters a woman's independence and feeling of responsibility.

The work in home economics includes:

A four-year course, leading to degree of bachelor of science.

A three-year course in the School of Agriculture.

A six-months housekeepers' course, for which a certificate of proficiency is granted.

COURSE IN HOME ECONOMICS

The popularity of the four-year home economics course is evidenced by the fact that fully eighty-five per cent of the girls who graduate from the College graduate from this course. The training is both general and specific. Since scientific training is fundamental in the intelligent and successful administration of the home, strong courses in the sciences are given as a foundation for the special training in home economics. To the end that well-rounded culture may be attained, courses in English, history, economics, and psychology receive due prominence. The time of the student is about equally divided among the purely technical subjects, the fundamental sciences, and the cultural studies. The courses in the related subjects are given in the different departments of the College, while the technical courses are given by the home economics departments. In the junior and senior years opportunity is given for choice of electives, which makes it possible for the student to specialize in some chosen line. To this end electives are to be chosen in groups combined logically in courses approved by the Faculty or by the student's dean.

The four-year course is recommended for all who desire to teach domestic science or domestic art. It is with difficulty that the home economics training schools meet the demand for well-prepared teachers, a demand which is increasing more rapidly each year. The College does not assume the responsibility of insuring employment to graduates, but the latter rarely experience difficulty in obtaining remunerative positions as instructors in domestic science or in domestic art, as dietitians, or as professional housekeepers.

Course in Home Economics

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
English I 4 (4-0)	English II 4 (4-0)	College Rhetoric I 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Household Physics 4 (4-0)	Food Preparation 4 (2-4)	Textiles 4 (2-4)
Object Drawing 2 (0-4)	Library Methods 2 (1-2)	Color and Design I 2 (0-4)
Domestic Art I 2 (0-4)	Domestic Art II 2 (0-4)	Domestic Art III 2 (0-4)
Physical Training	Physical Training	Physical Training

SOPHOMORE

Qualitative Analysis 4 (2-4)	Elementary Organic Chemistry 4 (4-0)	Human Physiology 4 (4-0)
General Zoölogy I 4 (2-4)	General Zoölogy II 4 (2-4)	Embryology 4 (2-4)
Elementary German I 4 (4-0)	Elementary German II 4 (4-0)	German Readings 4 (4-0)
Costume Design 4 (0-8)	Drafting and Pattern Making 2 (0-4)	Dressmaking 2 (0-4)
Physical Training or Music	Geometrical Drawing 2 (0-4)	Working Drawings 2 (0-4)
	Physical Training or Music	Physical Training or Music

JUNIOR

College Rhetoric II 4 (4-0)	English Literature I 4 (4-0)	English Literature II 4 (4-0)
Human Nutrition 4 (4-0)	Food and Nutrition I 6 (3-6)	Food and Nutrition II 6 (0-12)
Household Microbiology I 4 (2-4)	Household Microbiology II 4 (2-4)	Home Sanitation 4 (4-0)
Advanced Dressmaking 2 (0-4)		
Elective or Psychology 4 (4-0)	Elective 4 (-)	Elective 4 (-)

SENIOR

Household Chemistry 4 (1-6)	Household Entomology 2 (2-0)	History of Costume 2 (2-0)
American Government 4 (4-0)	American History I 4 (4-0)	Economics 4 (4-0)
Dietetics 4 (2-4)	Home Nursing 3 (3-0)	Psychology or Elective 4 (4-0)
Kitchen Gardening 2 (2-0)	Therapeutic Cookery 3 (1-4)	Ornamental Gardening 2 (2-0)
Elective 4 (-)	Home Architecture 2 (0-4)	Home Decoration 2 (0-4)
	Elective 4 (-)	Elective 4 (-)

Electives in Home Economics

Home Econ. Edu. 2 (2-0)	Home Management 4 (4-0)	Bread Making 4 (2-4)
Obs. and Tech. of Teach. 1 (0-2)		
Practice Teaching 1 (0-2)		
Tailoring 4 (0-8)	Millinery 4 (0-8)	Art Needlework 4 (0-8)
Inorganic Chemistry I 5 (3-4)	Inorganic Chemistry II 5 (3-4)	Inorganic Chemistry III 5 (3-4)
Organic Chemistry I 5 (3-4)	Organic Chemistry II 5 (3-4)	Organic Chemistry III 5 (3-4)
Physiological Chemistry I 4 (4-0)	Physiological Chemistry II 4 (4-0)	Physiological Chemistry III 4 (2-4)
Advanced Zoölogy I 4 (2-4)	Advanced Zoölogy II 4 (2-4)	Advanced Zoölogy III 4 (2-4)
Parasitology 3 (2-2)	Ev. of Domestic Animals 2 (2-0)	General Zoöl. Technique 4 (1-6) or Economic Zoölogy 4 (2-4)
Study of Oratory 4 (4-0)	The English Drama 4 (4-0) or The English Novel 4 (4-0)	American Literature 4 (4-0) or Nineteenth Century Lit. 4 (4-0)
Bible English 4 (4-0)	Farm and Home English 4 (4-0)	Business English 4 (4-0)
English History 4 (4-0)	French History 4 (4-0)	Modern Europe 4 (4-0) or American History II 4 (4-0)
Sociology 4 (4-0)	Business Organization 2 (2-0)	Money and Banking 2 (2-0)
Educational Psychology 4 (4-0)	Wage Problems 2 (2-0)	Public Finance 2 (2-0)
School Adm. and School Law 4 (4-0)	History of Education 5 (5-0)	Principles of Education 4 (4-0)

NOTE.—Students intending to teach should elect the educational subjects listed above.

Domestic Art

Professor BIRDSALL.
Instructor COWLES.
Assistant HUMFELD.
Assistant MUTHLER.
Assistant PETERSEN.
Assistant HOBBS.
Assistant HIMMELEIN.
Assistant FEWELL.

The object of the instruction in domestic art is to give young women a practical knowledge of the selection of materials; the growing of textile fibers, and the processes used in their manufacture into fabrics. The course also offers instruction in hand and machine sewing; principles of drafting and designing patterns; dressmaking, tailoring, millinery, costume design, history of costume and textiles. The student furnishes all her materials.

1.—DOMESTIC ART I. Freshman year, fall term. Laboratory, four hours. Two credits. Required in the course in home economics; elective in the course in general science.

This course includes practice in hand sewing, fundamental stitches being applied to simple articles; patching and darning; use of the sewing machine; making corset cover.

2.—DOMESTIC ART II. Freshman year, winter term. Laboratory, four hours. Two credits. Required in the course in home economics; elective in the course in general science. Prerequisite: Domestic Art I.

This course continues the work of Domestic Art I. The appropriate materials and trimmings for undergarments are discussed; use of sewing machine and attachments; pattern drafting; cutting and making drawers, skirt, and nightgown.

3.—DOMESTIC ART III. Freshman year, spring term. Laboratory, four hours. Two credits. Required in the course in home economics; elective in the course in general science. Prerequisite: Domestic Art II.

This course instructs in a simple system of pattern drafting with the use of tapeline and square; making shirt waist and skirt. Materials used may be of cotton or linen.

4.—TEXTILES. Freshman year, spring term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in home economics. Prerequisite: Course 3.

This course considers the primitive forms of textile industries and their development; the present method of spinning and weaving; classification; manufacture and finish of all important fibers.

Laboratory.—The laboratory work considers the identification of fibers and substitute materials by means of the microscope; chemical tests to determine adulteration and admixtures of cloth; identifying materials, names, prices, widths, variation of weaves; cleaning, laundering and dyeing; weaving rag rug.

5.—COSTUME DESIGN. Sophomore year, fall term. Laboratory, eight hours. Four credits. Required in the course in home economics; elective in the course in general science.

This course includes a study of the principles of design, color harmony, and the application of art in dress; original problems and their direct application to designs for textiles, embroideries, and costumes; sketching of costumes in pencil and water color; costumes for reproduction in materials in direct relation to dressmaking.

6.—DRAFTING AND PATTERN MAKING. Sophomore year, winter term. Laboratory, four hours. Two credits. Required in the course in home economics; elective in the course in general science.

This course gives practice in taking measures, drafting and designing patterns. All foundation patterns are drafted to measure and fitted; designs are draped on the form without patterns, using cheesecloth and other suitable inexpensive materials.

7.—DRESSMAKING. Sophomore year, spring term. Laboratory, four hours. Two credits. Prerequisites: Domestic Art 5 and 6.

This course includes practice in adapting bought patterns in making a cloth dress and a fancy waist.

8.—ADVANCED DRESSMAKING. Junior year, fall term. Laboratory, four hours. Two credits. Required in the course in home economics. Prerequisite: Domestic Art 7.

This course emphasizes the artistic side of line and decoration in dress; presents the use of bought patterns; includes more practice in the cutting, fitting and finish of an elaborate street, house or evening dress. Materials may be either of wool or silk.

9.—HISTORY OF COSTUME. Senior year, spring term. Class work, two hours. Two credits. Required in the course in home economics.

This course includes a survey of ancient Egyptian, Grecian, Roman,

early and modern French costumes. Its aim is to give the student information regarding these different periods; comparisons are held regarding the adaptation to present fashions.

10.—ART NEEDLEWORK. Junior year, spring term. Laboratory, eight hours. Four credits. Elective in the course in home economics.

This course includes the following: fine needlework; stitches in crochet, knitting, cross-stitch, French embroidery, Roman cut work; their application to undergarments, waists, collars, and household linens.

11.—TAILORING. Senior year, fall term. Laboratory, eight hours. Four credits. Elective in the course in home economics. Prerequisite: Domestic Art 8.

This course includes discussions of materials suitable for tailored suits; sponging, cutting, fitting and finishing a coat and skirt.

12.—MILLINERY. Senior year, winter term. Laboratory, eight hours. Four credits. Elective in the course in home economics.

This course includes practical and artistic principles of millinery; preparing various materials for trimmings; practice in making bows, rosettes, and other forms of hat decoration; making wire and buckram frames; use of velvet, silk and straw; renovating, and use of old materials.

13.—PRESENTATION OF DOMESTIC ART. Senior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in home economics.

This course considers the relation of domestic art to education; the method of teaching it in various kinds of schools; its relation to the curriculum; the planning of lessons and courses of study; problems in equipment, cost, and management. The laboratory work consists of observation and teaching.

Domestic Science

Professor VAN ZILE.
Associate Professor Dow, in charge.
Instructor LINDSEY.
Instructor CATON.
Instructor FORD.
Instructor RIGNEY.
Instructor MEADE.
Assistant WILLIAMS.
Assistant GREEN.
Assistant WELCH.
Assistant _____.

Technically, domestic science is an application of the science of bacteriology to the study of home sanitation and hygiene; of physiology and chemistry to the composition of foods and their effect upon the human body; of physics as applied to heating and lighting. Since the home is dependent upon the sciences of chemistry, physiology, and bacteriology, and the application of these to hygiene, direct use of the principles of these sciences is made in the lessons in cookery, dietetics home nursing, and household management. In the kitchen laboratory a standard system of measurement is taught, and constant emphasis is laid upon neatness, accuracy, and economy in the handling of materials and utensils. Science, applied science, and practice are presented in their proper relations, so that the student who completes these courses gains not only a theoretical knowledge of the principles underlying the profession of home making, but experience in applying them.

1.—FOOD PREPARATION. Freshman year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in home economics; elective for young women in the courses in general science and industrial journalism.

Foods are classified, according to similarities in their composition, into groups representative of the five food types—carbohydrates, fats, proteins, mineral matter, and water; their sources, composition and digestive value are considered. The conditions under which food materials are matured and marketed, and the problems which relate to their storage and transportation are also considered.

Laboratory.—Principles underlying the cookery of food are illustrated in the preparation of representative foods.

2.—FOOD AND NUTRITION I. Junior year, winter or spring term. Class work, three hours; laboratory, six hours. Six credits. Required in the course in home economics; elective for young women in the courses in general science and industrial journalism. Prerequisite: Human Nutrition, Microbiology I.

This course comprises a study of food and its relation to the body, to the composition of the body, and to the daily income of nutrients required and the output of waste. Carbohydrates are considered as to their classification, composition, occurrence, and general properties, which matters are followed by a study of typical carbohydrate foods. Fats and proteins are studied in the same manner. Food values and costs are emphasized throughout the course. Lectures are given and reference work is required.

Laboratory.—Experimental cookery. This is an experimental study of carbohydrates, fats, and proteins, the knowledge thus gained being then applied to the preparation of foods of known composition.

3.—FOOD AND NUTRITION II. Junior year, spring term. Laboratory, twelve hours. Six credits. Required in the course in home economics; elective for young women in the courses in general science and industrial journalism. Prerequisite: Food and Nutrition I.

Marketing and serving and fruit preservation are taken up. This course gives an opportunity for practice in home cookery, and includes the planning, preparation and serving of meals, with practice in the canning of fruits and vegetables and in fancy cookery.

4.—DIETETICS. Senior year, fall term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in home economics.

This course comprises a study of the fundamental principles of human nutrition, as applied to the feeding of individuals under varying physiological, economic, and social conditions; a study of the metabolism of carbohydrates, fats, and proteins, and a discussion of dietary standards. Lectures are given and reference work is required. Prerequisites: Food and Nutrition I.

Laboratory.—A practical comparison is made of the nutritive values of the common foods by computing, preparing and serving dietaries of specific costs in which specified nutrients are furnished.

5.—HOME SANITATION. Junior year, spring term. Class work, four hours. Four credits. Required in the course in home economics.

This course includes a study of the conditions which determine the healthfulness of the house, and the application of principles of sanitation to its care. Sanitary construction, ventilation, heating, lighting and plumbing of the house are considered. Lectures are given and reference work is required. Prerequisite: Working Drawings.

6.—HOME NURSING. Senior year, winter term. Class work, three hours. Three credits. Required in the course in home economics.

This course covers the furnishing and care of the sick room, the giving of baths, administration of medicines, recording of symptoms, the giving of first aid to the injured, and the intelligent use of antiseptics and disinfectants.

7.—THERAPEUTIC COOKERY. Senior year, winter term. Class work, one hour; laboratory, four hours. Three credits. Required in the course in home economics. Prerequisite: Dietetics.

Abnormal conditions of digestion, assimilation, and metabolism, alterations of secretions, and destruction of tissue due to disease, are studied, together with those diets adapted to the conditions and needs of the system under special conditions.

Laboratory.—This comprises a study of diet in relation to disease, together with the preparation of food suitable for the sick, including the arrangement of attractive trays for the invalid.

8.—PRESENTATION OF DOMESTIC SCIENCE. Senior year, fall term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in home economics. Prerequisite: Food and Nutrition I.

This course includes the work described under Rural and Vocational Education as: Home Economics Education, Observation and Technique of Teaching, and Practice Teaching.

This is a study of methods of preparation on the part of the teacher for the class exercises, the mode of conducting it, the making of lesson and course outlines, and the arrangement and equipment of laboratories, together with the cost of equipment and supplies.

Laboratory.—The laboratory work consists of observation, demonstration, and practice teaching.

9.—HOUSEHOLD ADMINISTRATION. Senior year, winter term. Class work, four hours. Four credits. Elective in the course in home economics.

The purpose is to secure an intelligent judgment regarding the general management of the home. The place of the home and the homemaker in the economic world, the organization of the household, the value and cost of house furnishings and their care, the apportionment and judicious expenditure of the income, the method of keeping accounts, and the general cost of living, are the subjects studied. Lectures are given and reference work is required.

10.—BREAD MAKING. Senior year, spring term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in home economics. Prerequisite: Food and Nutrition I.

This course includes a microscopic study of yeasts, a careful consideration of milling methods, visits to mills, and an investigation of all the conditions that may affect the quality of bread. Many methods are followed in the preparation of bread, and comparisions are made of the various methods.

Housekeepers' Course in Home Economics

There are large numbers of young women who, from lack of time, are unable to take an extended course, but who recognize the need for special training in home making. The twentieth century demands of home managers an understanding of the sanitary requirements of the home, a knowledge of values, absolute and relative, of the articles used in the house, quick attention to details, good judgment in buying, and a ready adaptation of means to the end in view. The purpose of the housekeepers' course is to furnish this training. The teaching in this course is no less accurate than in the regular course, but is necessarily different. Given to students without scientific training, the instruction must be more largely a presentation of facts, without an elaboration of the underlying principles. The work is intensely practical, and the hundreds of young women who take this course go back to their homes with a broader view of life, and a knowledge and training that will enable them to meet their responsibilities.

REQUIREMENTS FOR ADMISSION

Young women between the ages of eighteen and twenty-one are admitted upon presentation of common-school diploma, grammar-school certificate, or high-school diploma, or upon passing an examination in the following subjects: reading, writing, spelling, arithmetic, grammar, geography, physiology, and United States history. Young women over twenty-one are admitted without examination.

HOUSEKEEPERS' COURSE

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FALL TERM.	WINTER TERM.
Cookery I	4 (0-8)
Sewing	6 (0-12)
Color and Design.....	3 (0-6)
	Cookery II
	Home Nursing
	Dressmaking
	Floriculture

SUBJECTS TAUGHT IN HOUSEKEEPERS' COURSE

COOKERY I. Fall term, ten hours.

A laboratory course. Stoves, stove construction, stove management, and fuels are the first topics considered, and are followed by experiments illustrating the effect of heat upon starch and proteids. The necessary elementary principles involved are then applied to the cooking of cereals, vegetables, beverages, breads, meats, soups, and simple cake mixtures and puddings.

SEWING. Fall term. Laboratory, twelve hours.

This course covers a full course in hand sewing; practice in the fundamental stitches being applied to simple articles, consisting of a bag, towel, patching, and darning, etc. The appropriate materials and trimmings for undergarments are discussed; sewing machine problems and their attachments; pattern drafting; cutting and making corset cover, drawers, underskirt, and shirt-waist suit.

Materials used may be of cotton or linen. The student furnishes all her materials.

COLOR AND DESIGN. Fall term, six hours.

A laboratory course in simple designing and in studying color relations, with special reference to problems in the home.

COOKERY II. Winter term, twelve hours.

A laboratory course. The work of the term is divided into three parts. Four weeks are given to the planning and serving of meals; four weeks to the study of diet in relation to disease, with the preparation of suitable food; and four weeks to canning, preserving, and the making of salads, cakes, pastries, and desserts.

HOME NURSING. Winter term, two hours.

This course includes the study of the sick room and its care and furnishing, and the duties of the home nurse in giving intelligent assistance to the physician, and in contributing to the comfort of the sick. This involves also the ability to recognize and report symptoms correctly; to relieve pain; to give baths; to change bedding; to disinfect; and to treat wounds, burns, and sprains, as well as to meet successfully other emergencies that may arise in the home.

DRESSMAKING. Winter term. Laboratory, eight hours.

This course includes practice in the following: Adaptation of patterns, cutting, fitting, and making a cloth dress and fancy waist. The student furnishes all her materials.

FLORICULTURE. Winter term. Class work, two hours; laboratory, one hour.

Lectures in the classroom are supplemented by practical exercises in the greenhouse, dealing with the propagation and culture of flowers. Soil requirements, the planting of seeds, transplanting, cultivation, the making of cuttings, the selection of varieties adapted to the purposes of window gardening, lawn planting and cutting, are discussed in the lectures. An opportunity to become acquainted with the species recommended, and with the operations necessary for their successful culture, is afforded in the laboratory practice.

HOME ECONOMICS IN THE SUMMER SCHOOL

In addition to instruction in various branches of home economics available to many teachers in the spring term, the College offers several courses in this subject during the summer session. Instruction in these courses is intended to represent correctly that which may be introduced successfully into graded schools and high schools. Students will be enrolled upon presentation of a teacher's certificate, or of a certified statement showing that two years' high-school work or its equivalent has been completed.

The general subject of the presentation of home economics is one of the courses offered. Here attention is given to the application of the general principles of teaching to the teaching of domestic science and domestic art, to the planning of lesson and course outlines, and to the equipment of laboratories for grade schools and high schools.

In the courses in domestic science the preparation of food is discussed in its different phases, and the principles studied in the classroom are amply illustrated in the laboratory demonstrations.

In the courses in domestic art, the theory of hand and machine sewing, making shirt-waists suits, and drafting and designing is taught and given ample laboratory demonstration.

A special circular giving in detail the courses offered in the Summer School may be had by applying to the President of the College. See, also, the article on Summer School in this catalogue.

Division of General Science

JULIUS TERRASS WILLARD, *Dean.*

In the class of colleges to which this institution belongs, the classical studies of the older type of college are replaced by work in the sciences and in vocational subjects. A sound basis for technical training includes thorough training in mathematics, physical science, and biological science. It is believed also that education should include some preparation for the discharge of one's duties to the state and to the community in which he lives. It should afford him that discipline and culture which alone can give him a grasp of the relations among things, a breadth of view, a tolerant attitude, and hence an influence over his associates and fellow citizens of every station in life.

It is the province of the departments grouped in this division of the College to give this basal scientific, cultural, and disciplinary training. Their work is not only foundational, but it penetrates through all the characteristic vocational courses of the institution, as the structural steel of the modern skyscraper penetrates the entire building and forms a secure framework and support for the parts more readily visible. These departments thus give unity to all of the four-year courses of study, although presenting but two courses that are distinctive of their own work. These, however, by means of electives and options, are susceptible of manifold modification and application.

THE COURSE IN GENERAL SCIENCE

The course in general science is the lineal descendant of the single course formerly offered here. It includes the fundamental training in English, mathematics, science, history, economics, military drill, and physical culture required in the several specialized vocational courses now offered by the College and chosen by the great body of our students. Its required subjects constitute the central educational basis of the institution. By means of a number of groups of electives, it gives an opportunity to students to advance themselves still further in these fundamental lines and to give special attention to some instead of taking the vocational subjects characterizing other courses. This opportunity meets the need of several types of young people, among whom are: (1) Those who have not yet fully decided as to their vocation, but who wish an education that is strong and well balanced in respect to modern science and cultural subjects, as a foundation for further education or as a preparation for sound citizenship

and intellectual satisfaction in life. (2) Those who are looking forward to teaching in the high schools of the State. The electives offered allow one to give special attention to mathematics, physical science, biological science, elementary agriculture, elementary domestic science and art, history, economics, English, and professional educational subjects. (3) Those who are fitting themselves for research work in the sciences, especially as applied to agriculture, engineering, and other industries.

The elective groups offered in this course are to a considerable extent made up of studies required in one or more of the specialized courses. They provide also, however, advanced work not included in other courses. The scientific work in connection with the Agricultural and Engineering Experiment Stations, and several fields of State investigation and service, calls for the operation of unusually well-equipped departments in the sciences, and excellent facilities for practical training in this work are thus afforded.

While the course in general science offers a wide choice of electives, these may not be selected aimlessly, or with the idea of choosing the easiest, or of obtaining credit for miscellaneous subjects taken elsewhere or in other courses. The studies of the freshman and sophomore years are basal and are required of all, without exception. They insure a broad and adequate foundation for subsequent work in the several lines of electives. The electives are to be chosen in groups, combined logically in courses approved by the Faculty or by the dean of the Division of General Science. Students changing from other courses to the course in general science receive credit for work done in the other courses in so far as it fits into the general plan of this one.

The course in general science in the junior and senior years requires of all students civics, American history, economics, psychology, and philosophy. This gives opportunity for the election of twenty-two or more additional studies. Not fewer than ninety credit units are to be chosen in groups, in such a manner as to give logical coherence to the course as a whole. The elective portion of the course, as thus made up, will consist for the most part of several groups of three full studies or their equivalent. It is possible to include one group of three studies and a single additional study that may be advantageously taken without others. For a few courses special combinations in sewing, cooking, and shop work have been planned to meet the needs of prospective teachers of manual training. If vocational subjects are elected from courses in which a greater number of credits are required for graduation than are required in the course in general science, these are evaluated in this course as being in the same ratio toward the total requirement as they are in the courses from which the subjects are chosen.

The course in general science is thus many in one. Such

various combinations of groups are possible that it is not practicable to print all of them in extended form. There are, therefore, formally presented herewith the required subjects of the course in their specified order by years and terms, together with a considerable number of groups of electives.

Finally, combinations of these groups that have been approved are indicated by means of numbers assigned to the several groups. Other combinations may be arranged.

THE COURSE IN INDUSTRIAL JOURNALISM

Knowledge is power only as it comes into the possession of those who can use it; it gives pleasure in direct proportion to the extent of its diffusion. A discovery is of but little value as long as the discoverer is the only one who knows of its existence, and the printed page is by far the most effective means of extending knowledge concerning it. Magazines and newspapers never sleep, nor do they take vacations, and their power to elevate mankind is incalculable. But printed knowledge becomes effective only as it is read, and to be read in this day it must stand out from the great mass of other matter, and gain the attention and hold the interest of the reader. To do this, its points must be sharp and easily seen, and the style must be attractive. On the other hand, if the presentation is not essentially true, the more attractive it is the worse it is, and the greater the harm that follows wide reading of it.

The purpose of the course in industrial journalism is to equip men and women with fundamental knowledge, that they may both recognize that which is new, and distinguish truth from falsehood; to enable them to set a proper valuation upon facts as related to the industrial world, that the emphasis of their writings may be properly placed; and to write clear, accurate, forceful, entertaining English.

A writer might advantageously know everything; this being impossible and the field being so broad, this course as offered by the College includes, in the first place, studies that are basic to all industrial life and its presentation—English, history, economics, physics, chemistry, the biological sciences, etc., and two years in the theory and practice of effective writing and publication. In the second place, this course gives opportunity for choice of elective groups of subjects directed towards agriculture, mechanic arts, home economics, or general science. Thus, a student may elect subjects that will give special knowledge concerning farm crops, live stock, horticulture, forestry, mechanic arts, home economics, etc.

The College thus affords preparation for work in a wide and inviting field. Our unprecedented industrial achievements have been made by the application of discoveries in physical and biological science. Much of discovery, and much of application, is yet to come, and one who can write truthfully and attractively of that which is, and of that which comes, will find ample reward.

Course in General Science

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours a week of recitation and of laboratory, respectively.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
English I 4 (4-0)	English II 4 (4-0)	College Rhetoric I 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (2-4)	Chemistry III 4 (3-2)
Plane Trigonometry 4 (4-0)	College Algebra 4 (4-0)	Public Speaking 4 (4-0)
General Zoölogy I 4 (2-4)	General Zoölogy II 4 (2-4)	Embryology 4 (2-4)
Library Methods 2 (1-2)	Object Drawing 2 (0-4)	Geometrical Drawing 2 (0-4)
Military Drill* or Physical Training†	Military Drill* or Physical Training†	Military Drill* or Physical Training†

SOPHOMORE

College Rhetoric II 4 (4-0)	English Literature I, or English Literature‡ 4 (4-0)	English Literature II, or Analytical Geometry‡ 4 (4-0)
General Physics I 4 (3-2)	General Physics II 4 (3-2)	General Physics III 4 (3-2)
Qualitative Analysis 4 (2-4)	El. Organic Chemistry 4 (4-0)	Advanced English History 4 (4-0)
General Botany 5 (3-4)	Plant Anatomy 5 (3-4)	Plant Physiology 4 (2-4)
Military Drill* or Physical Training†	Military Drill* or Physical Training†	Elective 2 (-)
		Military Drill* or Physical Training†

JUNIOR

Psychology 4 (4-0)	Economics 4 (4-0)	American Government 4 (4-0)
Electives§ 14 (-)	Electives§ 14 (-)	Electives§ 14 (-)

SENIOR

American History I 4 (4-0)	Philosophy 4 (4-0)	
Electives 14 (-)	Electives 14 (-)	Electives 14 (-)

* For young men.

† For young women.

‡ If the student is planning to elect the biological groups for the junior and senior years, English Literature and Analytical Geometry must be chosen at this point instead of English Literature I and English Literature II.

§ Electives are to be chosen by groups, and in combinations approved by the Faculty or the dean of the Division of General Science.

Elective Groups—Course in General Science

FALL TERM.	WINTER TERM.	SPRING TERM.
	1	
Elementary German I 4 (4-0)	Elementary German II 4 (4-0)	German Readings 4 (4-0)
	2	
German Comedies 4 (4-0)	German Prose I 4 (4-0)	German Prose II 4 (4-0)
	3	
Analytical Geometry 4 (4-0)	Differential Calculus 4 (4-0)	Integral Calculus 4 (4-0)
	4	
Radiant Energy 4 (3-2)	Physical Measurements 4 (2-4)	Physical Manipulations 4 (2-4)
	5	
Inorganic Chemistry I 5 (3-4)	Inorganic Chemistry II 5 (3-4)	Inorganic Chemistry III 5 (3-4)
	6	
Organic Chemistry I 5 (3-4)	Organic Chemistry II 5 (3-4)	Organic Chemistry III 5 (3-4)
	7	
Physiological Chemistry I 4 (4-0)	Physiological Chemistry II 4 (4-0)	Human Physiology 4 (4-0), or General Geology 4 (4-0), or both
	8	
Adv. Zoölogy I 4 (2-4), or General Bacteriology 4 (2-4)	Adv. Zoölogy II 4 (2-4)	Adv. Zoölogy III 4 (2-4)
	9	
Plant Pathology I 4 (2-4)	Plant Pathology II 4 (2-4)	Taxonomic Botany 4 (1-6)
	10	
Economic Botany 4 (2-4)	Evolution of Plants 4 (4-0)	Plant Breeding or Plant Physiology III 4 (2-4) Mathematics of Biology 4 (4-0)
	11	
General Entomology 4 (3-2)	Taxonomy of Insects 4 (0-8)	Gen. Economic Entomology 4 (3-2)
	12	
Plant Pathology I 4 (2-4)	Parasitology 3 (2-2)	Economic Zoölogy 4 (2-4) Mathematics of Biology 4 (4-0)
	13	
Plant Pathology I 4 (2-4)	Dairy Bacteriology 4 (2-4)	Hygienic Bacteriology 4 (2-4)

ELECTIVE GROUPS—COURSE IN GENERAL SCIENCE—*continued.*

FALL TERM.	WINTER TERM.	SPRING TERM.
	14	
Soil Microbiology 4 (2-4)	Serum Therapy 4 (3-2)	Water Purification and Sewage Disposal 4 (1-6)
		Mathematics of Biology 4 (4-0)
		15
General Bacteriology 4 (2-4)	Household Microbiology II 4 (2-4)	Human Physiology 4 (4-0)
		16
Human Nutrition 4 (4-0)	Food Preparation 4 (2-4)	Food and Nutrition II 6 (0-12)
	Food and Nutrition I 6 (3-6)	
		17
Domestic Art I 2 (0-4)	Domestic Art II 2 (0-4)	Domestic Art III 2 (0-4)
Costume Design 4 (0-8)	Drafting and Pattern Making 2 (0-4)	Dressmaking 2 (0-4)
Color and Design I 2 (0-4)		Working Drawings 2 (0-4)
		18
History of Education 5 (5-0)	Prin. of Education 4 (4-0)	School Administration 4 (4-0)
School Hygiene 2 (2-0)	Agricultural Education or Home Econ. Education or Industrial Education 2 (2-0)	Educational Psychology 4 (4-0)
		19
Cereal Crop Production 5 (3-4)	Forage Crops 4 (3-2)	Poultry Management 2 (2-0)
Live Stock I 3 (1-4)	Farm Mechanics 4 (2-4)	Live Stock II 3 (1-4)
		20
Live Stock II 2 (0-4)	Elective in Agriculture 4 (-)	Plant Propagation 4 (3-2)
Elements of Dairying 4 (2-4)	Farm Forestry 4 (3-2)	Live Stock IV 3 (1-4)
Forage Crop Improvement 4 (1-6)	Soils 5 (3-4)	Landscape Gardening 3 (2-2)
		21
Woodwork I 2 (0-4)	Woodwork II 2 (0-4)	Blacksmithing I 3 (1-4)
Woodwork III G 6 (2-8)	Woodworking IV G 3 (1-4)	Foundry 3 (1-4)
	Wood Turning G 3 (1-4)	Pattern Making 3 (1-4)
		22
Engineering Physics I 5 (3-4)	Engineering Physics II 5 (3-4)	Engineering Physics III 6 (4-4)
Blacksmithing II 3 (1-4)	Blacksmithing III G 3 (1-4)	Blacksmithing IV G 2 (1-2)
Machine Shop I 2 (0-4)	Machine Shop II 3 (1-4)	Machine Shop III G 3 (1-4)
Clay Modeling 3 (0-6)		Kinematics I 4 (4-0)

ELECTIVE GROUPS—COURSE IN GENERAL SCIENCE— <i>continued.</i>		
FALL TERM.	SPRING TERM.	WINTER TERM.
		23
Rhetoric of Oratory 4 (4-0)	American Literature or 19th Century Literature 4 (4-0)	The English Drama or The English Novel 4 (4-0)
		24
History of Economic Thought 4 (4-0)	Business Organization 2 (2-0)	Money and Banking 2 (2-0)
	Labor Problems 2 (2-0)	Public Finance 2 (2-0)
		25
Theory of Music History of Music Harmony	One hour of each a week each term through the year, with instrumental or vocal music daily. 12 credit units.	
		26
Harmony, continued through the year, with instrumental or vocal lessons and daily practice. 12 credit units.		
		27
French History 4 (4-0)	Modern Europe 4 (4-0) or Business Law 2 (2-0) and International Law 2 (2-0)	American History II 4 (4-0) or Kansas History 2 (2-0) and Farm Law 2 (2-0)
		28
Sociology 4 (4-2)	Business Law 2 (2-0)	American Literature 4 (4-0)
	International Law 2 (2-0)	
		29
General Entomology 4 (3-2)	General Bacteriology 4 (2-4)	Human Physiology 4 (4-0) General Geology 4 (4-0)
		30
Elementary Journalism 2 (2-0)	Farm Writing 2 (2-0)	Gathering News 2 (2-0)
Journalism Practice I 2 (0-4)	Journalism Practice II 2 (0-4)	Journalism Practice III 2 (0-4)
		31
Copy Reading 2 (2-0)	Newspaper Law 2 (2-0)	Editorial Practice 2 (2-0)
Journalism Practice IV 2 (0-4)	Journalism Practice V 2 (0-4)	Journalism Practice VI 2 (0-4)
		32
Ink Rendering 2 (0-4)	Color Rendering 2 (0-4)	Linear Perspective 2 (0-4)
		33
General Bacteriology 4 (4-0)	Histology I 4 (2-4)	Histology II 4 (2-4)
Histology III 4 (2-4)	Comp. Physiology I 7 (5-4)	Comp. Physiology II 7 (5-4)
Pathology I 7 (5-4)	Pathology II 7 (4-6)	Pathology III 7 (4-6)

ELECTIVE GROUPS—COURSE IN GENERAL SCIENCE— <i>continued.</i>		
FALL TERM.	WINTER TERM.	SPRING TERM.
	34	
Sociology 4 (4-0)	Rural Sociology 4 (4-0)	Community Surveys 2 (2-0)
	35	
Argumentation and Debate 4 (4-0)	English Practice 4 (4-0)	Applied English 4 (4-0)
	36	
Bible English 4 (4-0)	Farm and Home English 4 (4-0)	Business English 4 (4-0)

The following subjects and others may be elected independently of other members of groups if prerequisites have been taken:

General Entomology 4 (3-2)	Technique of Speech 2 (2-0)	Human Physiology 4 (4-0)
General Bacteriology 4 (2-4)	General Bacteriology 4 (2-4)	General Geology 4 (4-0)
Sociology 4 (4-0)	Ethics 4 (4-0)	American Literature 4 (4-0)
Industrial Education 2 (2-0)	School Administration 4 (4-0)	Forms of Public Address 4 (4-0)
Modern Europe 4 (4-0)	Rural Sociology 4 (4-0)	American History II 4 (4-0)
Photography 3 (2-2)	Rural Education 4 (4-0)	German Classics 4 (4-0)

The following illustrative combinations have been arranged:

Physics and Mathematics—1, 3, 4, 5, 28, and 29.
 Chemistry, Physics, and Mathematics—1, 2, 3, 4, 5, 6, and Geology.
 Chemistry and Mathematics—1, 2, 3, 5, 6, and 7, including both Physiology and Geology.
 Chemistry and Domestic Science—1, 2, 5, 6, 7, 15, and 16.
 Biological Science, major work in Botany—1, 2, 7, 8, 9, and 10.
 Biological Science, major work in Zoölogy—1, 2, 7, 8, 11, and 12.
 Biological Science, major work in Bacteriology—1, 2, 7, 8, 13 and 14.
 Education and Domestic Science and Art—1, 2, 15, 16, 17, and 18.
 Education and Agriculture—1, 2, 18, 19, and 20.
 Education and Manual Training—3, 18, 21, and 22.
 Education and Humanities—18, 23, 24, and 27 and two groups Mathematics or Science.
 History and English—1, 2, 23, and 27 and two groups Mathematics or Science.
 History and Economics—1, 2, 24, and 27 and two groups Mathematics or Science.
 Economics and English—1, 2, 23, 24, and two groups Mathematics or Science.
 English and Music—1, 23, 25, 26, and two groups Mathematics or Science.

Students expecting to teach should take group 18.

Course in Industrial Journalism

The Arabic numeral immediately following the name of a subject indicates the number of credits, while the numerals in parentheses indicate the number of hours per week of recitation and of laboratory, respectively.

FRESHMAN

FALL TERM	WINTER TERM	SPRING TERM
English I 4 (4-0)	English II 4 (4-0)	College Rhetoric I 4 (4-0)
Chemistry I 4 (3-2)	Chemistry II 4 (3-4)	Chemistry III 4 (3-2)
Library Methods 2 (1-2)	Public Speaking 4 (4-0)	English History 4 (4-0)
Composition I-J 2 (0-4)	Composition II-J 2 (0-4)	
Object Drawing 2 (0-4)		Geometrical Drawing 2 (0-4)
Electives 4 (-)	Electives 4 (-)	Electives 4 (-)
Military Drill,* or Physical Training†	Military Drill,* or Physical Training†	Military Drill,* or Physical Training†

SOPHOMORE

College Rhetoric II 4 (4-0)	English Literature I 4 (4-0)	English Literature II 4 (4-0)
General Zoölogy I 4 (2-4)	General Zoölogy II 4 (2-4)	General Bacteriology 4 (2-4)
	Modern Europe 4 (4-0)	Economics 4 (4-0)
Electives 8 (-)	Electives 6 (-)	Electives 6 (-)
Military Drill,* or Physical Training†	Military Drill,* or Physical Training†	Military Drill,* or Physical Training†

JUNIOR

Elementary Journalism 2 (2-0)	Farm Writing 2 (2-0)	Gathering News 2 (2-0)
Journalism Practice I 2 (0-4)	Journalism Practice II 2 (0-4)	Journalism Practice III 2 (0-4)
American Government 4 (4-0)	American History I 4 (4-0)	American History II 4 (4-0)
Electives 10 (-)	Electives 10 (-)	Electives 10 (-)

SENIOR

Copy Reading 2 (2-0)	Newspaper Law 2 (2-0)	Editorial Practice 2 (2-0)
Journalism Practice IV 2 (0-4)	Journalism Practice V 2 (0-4)	Journalism Practice VI 2 (0-4)
Sociology 4 (4-0)	Business Organization 2 (2-0)	
Electives 10 (-)	Electives 12 (-)	Electives 14 (-)

The electives of this course are to be chosen in groups adapted to imparting added proficiency in selected lines of journalistic activity, especially those of agriculture, home economics, mechanic arts and applied science. Some of the possibilities are included in the list of elective groups available for students in the course in general science; others may be arranged by conference with the dean of the division.

* For young men.

† For young women.

Bacteriology

Professor BUSHNELL.
Instructor HUNTER.
Assistant JACKLEY.
Assistant _____.

The Department of Bacteriology occupies a part of the first and second floors of Veterinary Hall. The space is divided into offices and private laboratories, an experiment station and research laboratory, two large general laboratories, incubator or temperature room, wash room, and stock room. The laboratories are well lighted and equipped with gas, lockers, ice chests, sterilizers, wall cases, microscopes, and other modern facilities necessary for bacteriological work.

The instruction consists of lectures, recitations, demonstrations, and laboratory practice. Printed synopses of the lectures, and printed laboratory directions, are furnished the students in some of the courses; in others, textbooks are required. The departmental library contains textbooks on bacteriology and allied subjects, also the current files of the important technical periodicals relating to bacteriology. These are at the constant disposal of the students for reference. To those who desire graduate work, the department offers excellent facilities.

Bacteriology is presented to the student as a biological science, and as a practical factor in everyday life. In this subject only the simplest forms of life, consisting almost invariably of one-celled organisms, are studied. At the present time it is possible to study these microscopical forms with ease and accuracy, thus paving the way for a more complete study and a better understanding of cells in the aggregate. The second point of view from which this subject is approached is that of its practical application in agriculture, medicine, domestic science, and sanitary engineering.

COURSES IN BACTERIOLOGY

1.—GENERAL BACTERIOLOGY. Sophomore or junior year, fall, winter, and spring terms. Lectures, two hours; laboratory, four hours. Four credits. Required in the courses in agriculture and industrial journalism; elective in the course in general science. Prerequisite: Elementary Organic Chemistry.

This general introductory course consists of lectures, recitations, and demonstrations, covering the morphological and biological characters, the classification and the distribution of bacteria; factors necessary for the development of bacteria; culture media, cultural features, staining values, and fundamental principles of applied bacteriology.

Laboratory.—The student prepares culture media, and becomes familiar with the principles of sterilization and incubation, and with general laboratory technique. During the last half of the term, organisms representing the different families and genera of Migula's classification are studied microscopically and culturally. Also, preliminary quantitative and qualitative examinations are made of milk, water, soil, etc.

2.—PATHOGENIC BACTERIOLOGY. I, sophomore year, winter term; II, junior year, winter term. Lectures, two hours; laboratory, four hours. Four credits each term. Required in the course in veterinary medicine. Prerequisite: Elementary Organic Chemistry.

A study is made of the morphology, powers of resistance, pathogenesis,

distribution, channels of infection and means of dissemination of pathogenic bacteria, especially those related to the specific infectious diseases of animals; variations in the nature of infectious diseases; antitoxins, vaccines, and specific treatments; epizoötic and epidemic diseases of unknown etiology are further treated.

Laboratory.—A study is made of the microscopical and cultural character of pathogenic microorganisms; of laboratory animal inoculations, autopsy, and diagnosis; of the preparation of tuberculin, mallein, and other biological products used in the diagnosis, prevention and treatment of specific infectious diseases. Printed laboratory directions are furnished.

3.—SANITARY BIOLOGY I AND II. Sophomore year, spring term; junior year, fall term. Lecture, one hour; laboratory, four hours. Three credits each term. Required in the course in civil engineering. Prerequisite: Chemistry III.

Consideration is given to morphology, classification, distribution and life processes of bacteria. Attention is given, also, to general characters of algae, fungi and protozoa in their relation to potable water; to the interpretation of the results of quantitative and qualitative bacteriological examinations of water; to the significance of the presence of various bacterial species in drinking water; to water-borne diseases and micro-organisms involved; to typhoid-fever epidemics; to the bacteriology of sewage and sewage effluents, and to methods of water purification and sewage disposal.

Laboratory.—During the first term of this course the student acquires a working knowledge of bacteriological technique. The second term is utilized in conducting quantitative and qualitative examinations of water and sewage from different sources, according to the standard methods. The course includes a comparative study of presumptive tests for the detection of the presence of *B. coli communis* in water. Printed laboratory directions are furnished.

4.—HOUSEHOLD MICROBIOLOGY I AND II. Junior year, fall and winter terms, respectively. Class work, two hours; laboratory, four hours. Four credits each term. Required in the course in home economics. Elective in the course in general science. Prerequisite: Elementary Organic Chemistry.

This course is designed to give the student a more thorough knowledge of those microorganisms of importance in the household. The significance of microbial findings in the analysis of water, milk, and foods, also, consideration of the conditions which tend to increase or decrease the bacterial content of food substances, are studied in detail. Some time is given to the principles of sanitation as applied to public health problems. The class work is a more theoretical consideration of the problems undertaken in the laboratory.

Laboratory.—A study of microorganisms and their activities, both beneficial and harmful, in their relation to household economy, bacteriological study of water, milk, and foods; the determination of the potability of water; milk contamination, the effect of cooling upon the bacterial content of milk, pasteurization of milk, etc.; microscopical study of yeasts and molds; the spoilage of canned vegetables and fruits, methods of food preservation; the manufacture of vinegar; study of activities of various species of microorganisms, thermal death point, the germicidal action of various disinfectants, etc., are taken up in the laboratory work. Printed laboratory directions are furnished.

5.—SERUM THERAPY. Junior year, spring term. Lectures, three hours; laboratory, two hours. Four credits. Required in the course in veterinary science; elective in the course in general science. Prerequisites: Pathogenic Bacteriology I, and either Pathogenic Bacteriology II or Hygienic Bacteriology.

A detailed study is made of the manufacture, standardization, preparation for the market, and use of vaccines, antitoxins, and other biological products related to the diagnosis, prevention and treatment of specific infectious diseases; of susceptibility, immunity, and infection; of theories of immunity; of anaphylaxis, opsonins, precipitins, bacteriolysins, and agglutinins.

Laboratory.—Experimental production of opsonins, antitoxins, agglutinins, precipitins, and cytolsins; experiments showing the constitution and mode of action of these antibodies; production of active and passive anaphylaxis, and of anaphylatoxin; methods for the production and standardization of biological products, such as diphtheria and tetanus antitoxin, bacterins, etc.; the application of the various phenomena of immunity in the diagnosis of infectious diseases; the identification of animal and vegetable proteins; complement fixation tests for glanders, Wassermann tests, opsonic technique, etc., comprise the laboratory work.

6.—SOIL MICROBIOLOGY. Elective, fall term. Lecture, two hours; laboratory, four hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: General Bacteriology.

This is an introductory course covering the principles of soil microbiology as defined at the present time, and fitting the student for independent research on microbial investigations of soil, including the influence on microbial flora of depth and character of soil, temperature, moisture, chemical reaction, aeration, and other factors; activities of soil microorganisms, ammonification, nitrification, denitrification, symbiotic and nonsymbiotic nitrogen fixation. Printed copies of synopses of lectures are furnished. Various texts are recommended as reference books.

Laboratory.—The laboratory work comprises the preparation of various special culture media and reagents necessary to conduct bacteriological analyses of the soil; qualitative analysis and the laboratory study of ammonification, nitrification, denitrification, symbiotic and nonsymbiotic nitrogen fixation; plot experiments and field work illustrating the influence of various factors upon the bacterial flora, and the inoculation of soil with symbiotic nitrogen-fixing bacteria. Printed laboratory directions are furnished.

7.—HYGIENIC BACTERIOLOGY. Elective, winter term. Lectures, two hours; laboratory, four hours. Four credits. Elective in the courses in home economics and general science. Prerequisite: General Bacteriology.

Pathogenic bacteria, especially those related to diseases of man; channels of infection, and means of dissemination of pathogenic bacteria; epidemics, their cause and control; isolation, disinfection, and quarantine; prophylaxis against specific infectious diseases, and important precautions necessary in the control of communicable diseases, are studied. Jordan's *Textbook of Bacteriology* is recommended as a textbook.

Laboratory.—The laboratory work comprises microscopical and cultural study of pathogenic bacteria; technique involved in the diagnosis of *Bacterium tuberculosis* in sputum; the culture of pathogenic anaerobic bacteria; the isolation and identification of pathogenic bacteria from animal tissues, from pus and exudates; bacteriological examination of air, water, milk, sewage; interpretation of results, etc.

8.—DAIRY BACTERIOLOGY. Elective, spring term. Lectures, two hours; laboratory, four hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: General Bacteriology.

Consideration is given to the bacterial flora of milk, butter, and cheese; to infectious diseases conveyed through dairy products; to bacterial contamination of milk by air, water, utensils, etc.; to normal and abnormal fermentations in milk, their significance and control.

Laboratory.—The preparation of culture media necessary for dairy bacteriological work; milk contamination; quantitative and qualitative

bacteriological analyses of milk; the microscopical and cultural characters of the types of microorganisms representing the flora of milk, butter, and cheese; types of milk-fermenting organisms; the examination of cream, wash water, and separator slime; the effect of temperature on the growth of milk bacteria; pasteurization of milk; examination of milk for the presence of *Bacterium tuberculosis*, leucocytes and streptococci are taken up in the laboratory work. Various texts are recommended as reference books.

9.—BACTERIOLOGY OF POULTRY DISEASES AND POULTRY PRODUCTS. Elective, spring term. Lectures, two hours; laboratory, four hours. Four credits. Elective in courses in agriculture and general science. Prerequisite: General Bacteriology.

Consideration is given to the various microbial diseases of poultry; etiology, sources and modes of infection; prevention and cure; to the microbial content of freshly laid eggs, cold storage eggs, and egg products; with conditions tending toward increase or decrease of this content.

Laboratory.—Microorganisms pathogenic for poultry; artificial production, diagnosis and control of diseases in the laboratory; microbial content of eggs, and egg preparations produced and handled under various conditions, form the subject matter of the laboratory work. Laboratory directions are furnished.

10.—WATER PURIFICATION AND SEWAGE DISPOSAL. Elective, spring term. Lecture, one hour; laboratory, six hours. Four credits. Prerequisite: General Bacteriology or Sanitary Biology II.

The course comprises a study of the bacterial content of natural waters; of factors influencing the bacterial flora of the water; of bacterial indicators of pollution; of the collection and transportation of water samples; of methods of water purification and sewage disposal; of the application of water sanitation to rural homes and municipalities. Prescott and Winslow's *Elements of Water Bacteriology* and Savage's *Water Supplies* are recommended as textbooks.

Laboratory.—The laboratory work consists of quantitative and qualitative examinations, according to standard methods, of water and sewage samples; methods involved in the enumeration and identification of intestinal bacteria in water; laboratory study of conditions influencing the bacterial content and potability of water. Printed laboratory directions are furnished.

Botany

Professor ROBERTS.
Assistant Professor DAVIS.
Instructor MILLER.
Assistant ROSE.
Assistant JEHLE.
Assistant LODGE.

The instruction given in the Department of Botany has a threefold purpose:

First, general training in botany as an observational science, familiarizing the student with the meaning and relations of the manifold forms of plants, and the principles governing their life-processes. For those who wish to pursue the subject of botany professionally, excellent opportunities are offered to secure a broad and thorough training in the advanced courses given by the department.

Second, the importance of a scientific knowledge of the laws of plant life being fundamental in agriculture, it is sought in the elementary

courses to provide such training as will generally fit the minds of agricultural students to grasp the underlying meaning of familiar field work with crops; such training, moreover, as may be built upon in a carefully graded series of advanced courses.

The third phase of the work of the Department of Botany lies in the investigation of those economic problems in plant life which affect agriculture. Three distinct general lines of work in botany and plant breeding are being conducted in the Experiment Station: experimental plant breeding; the investigation, prevention and control of plant diseases; physiological investigations in drouth resistance; and seed control, *i. e.*, the determination of the purity and vitality of agricultural seeds for farmers, seedsmen, and others.

The equipment for elementary instruction comprises thirty compound and sixty-four simple microscopes, a series of Jung, Peter, Kny, and Frank botanical charts, a Bausch & Lomb projection apparatus, and a very full collection of preserved material for general morphology and pathology. For advanced work, Zeiss and Spencer microscopes with apochromatic lenses, a filar micrometer, a Bausch & Lomb camera lucida, a Zeiss drawing table, a Zeiss binocular microscope, and Bausch & Lomb simple microscopes of the highest grade, provided with special camera lucida attachment, are furnished for the use of the members of the staff and graduate students. A Minot precision microtome, Spencer microtome, embedding and sterilizing ovens, and the usual supplies of reagents and glassware, are provided for histological study.

In physiology, a complete equipment of the Ganong and the Cambridge lines of physiological apparatus and supplies is available. A large, well-equipped dark room, provided with a Folmer & Schwing enlarging, reducing and lantern-slide camera, a field camera of the best type, and a Bausch & Lomb photomicrographic apparatus, affords opportunity for the preparation of botanical photographs, lantern slides, illustrations for bulletins, etc.

In the Experiment Station laboratory are kept various instruments of precision employed in quantitative work in plant-breeding investigations, including special forms of apparatus used for taking measurements of organs, a specially designed gravimeter, an improved colorimeter, an Egli calculating machine, a Comptograph adding machine, a Corelli polar planimeter, specific gravity apparatus, numerous balances, the usual glassware, etc.

For general botanical reference there is an excellent herbarium, especially complete for the state of Kansas, and a very full collection of economic fungi. A very good botanical library is available, containing the usual standard texts and reference works, and files of the principal foreign journals.

COURSES IN BOTANY

1.—GENERAL BOTANY. Freshman year, fall term. Class work, three hours; laboratory, four hours. Five credits. Required in the courses in agriculture and general science. Text to be selected.

This is a general introduction to botany. A careful study is made of the morphology of the chief great groups of plants, of their elementary physiology and ecology, and of the classification and geographic distribution of the plant kingdom, and its economic relation to man.

Laboratory.—The aim of the laboratory work in this course is to give as thorough a study as may be of the morphology of the chief important groups in the plant kingdom, taken in the order of their relative complexity, and of their probable relations to one another as parts of an evolutionary series. An excellent and very complete series of prepared slides is of assistance in this work. Laboratory outlines are furnished by the department.

2.—PLANT ANATOMY. Freshman year, winter term. Class work, three hours; laboratory, four hours. Five credits. Required in the courses in agriculture and general science. Text, *Plant Anatomy*, by W. C. Stevens.

This course comprises a detailed study of the anatomical structure of the organs and tissues of the higher plants, with especial reference to their origin and mode of development.

Laboratory.—The laboratory work consists of a microscopic study of the development of the growing plant, of the origin and differentiation of leaf, stem and root organs, and the development of the flower and the seed. A study is also made of the development of internal tissue systems, such as the vascular bundles, latex vessels, resin ducts, etc.; of the protective system of bark and cortex, and of auxiliary tissues, such as sclerenchyma or hard bast fibers, as in flax, hemp, etc. The purpose of the course is to familiarize the student thoroughly with the anatomical and structural characters of the seed plants from the developmental standpoint. Laboratory outlines are furnished by the department.

3.—PLANT PHYSIOLOGY I. Freshman year, spring term; sophomore year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the courses in agriculture and general science. Prerequisites: General Botany; Plant Anatomy.

This is a course of lectures, combined with special study of a required text and with reference reading. The principal life functions of plants, such as photosynthesis, respiration, transpiration and growth, and the responses of plants to environmental conditions and physical stimuli, are studied in detail. In this course the student gains a general introductory knowledge of the functions and reactions of plants, and learns to regard them from the dynamic standpoint, as working organisms. Text, *Plant Physiology*, by C. R. Barnes.

Laboratory.—A series of typical experiments is followed out in the physiological laboratory and in the greenhouse. Each student is furnished with a set of the necessary apparatus, and learns to apply quantitative methods to the study of functions. Laboratory outlines are furnished by the department. Prerequisite: Laboratory work in General Botany and in Plant Anatomy.

4.—MEDICAL BOTANY. Sophomore year, fall term. Class work, one hour; laboratory, four hours. Three credits. Required in the course in veterinary medicine. Prerequisite: High-school Botany or General Biology.

This course involves a brief survey of the principal plants of the pharmacopœia. Especial attention is given to poisonous plants and their identification. Instruction is by lectures.

Laboratory.—This comprises microscopic study of plant products used as drugs, and a laboratory study of toxic plants. Laboratory outlines are provided by the department. Prerequisite: Laboratory work in Elementary Botany III.

5.—PLANT PHYSIOLOGY II. Sophomore year, spring term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in general science and in the course in agriculture. Prerequisite: Plant Physiology I.

This is work of an advanced character, dealing with the chief life

functions in considerable detail, and from the quantitative rather than the descriptive standpoint. In this course the student is conducted into exact and special studies of a few of the most important functions. Lectures and required readings.

Laboratory.—Apparatus of precision of the most accurate type is used by groups of students, who follow the exact details of functional behavior in the more important life processes, keep quantitative data and become gradually trained in methods of research. Laboratory outlines are furnished by the department. Prerequisite: Laboratory work in Plant Physiology I.

6.—PLANT BREEDING. Junior year, winter term. Class work, two hours; laboratory, four hours. Four credits. Required in the course in agriculture; elective in the course in general science. Prerequisite: General Botany.

This subject involves a study of the present knowledge of variation and heredity as applied to the breeding and improvement of economic plants. The history of the principal theories bearing upon genetic problems is reviewed, and the experimental data are critically considered. The principles underlying the behavior of hybrids are discussed. A survey is given of the practical results achieved in the breeding of plants, together with a scientific analysis of the methods used. Text, *Genetics*, by Walter, supplemented by lectures and reference reading.

7.—ADVANCED PLANT BREEDING. Elective, fall term. Class work, three hours; laboratory, two hours. Four credits. Elective in the course in agriculture. Prerequisite: Plant Breeding.

The work of Plant Breeding is continued, with especial reference to the practical details, technique, and history of the breeding of the principal economic plants. Research work and reference reading in the literature of Mendelian investigations are required. A thesis involving a review of the work in some phase of genetics is required. A reading knowledge of German is essential.

8.—ECONOMIC BOTANY. Elective, fall term. Class work, two hours; laboratory, four hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: Plant Morphology.

This course is designed especially for students intending to enter professional work in botany in experiment stations. It involves a study of the history of cultivated plants, with a course of lectures on the chief groups of the higher plants containing economic species. In this connection a very broad survey is taken of the world's economic plants, considerable attention being given to the derivation of economic products and to methods of cultivation and harvesting. The plants of tropical and subtropical agriculture and horticulture are given considerable attention. Forestry products are not considered. Text, *The Origin of Cultivated Plants*, by De Candolle. Lectures and reference reading.

Laboratory.—A microscopic study of economic plant products, such as fibers and textiles, food products, spices, etc. Laboratory outlines are furnished by the department. Prerequisite: Laboratory work in General Botany.

9.—PLANT PATHOLOGY I. Elective, fall term. Class work, two hours; laboratory, four hours. Four credits. Elective in the courses in general science and agriculture. Prerequisite: Plant Physiology II.

The diseases affecting the chief economic crops of field, orchard and garden are studied in considerable detail. The etiology of the various diseases and their most evident symptoms are discussed, and the student learns to recognize at sight the principal plant diseases he is likely to encounter on the farm and in nursery and in market-garden work. Physiological and bacterial diseases are considered to some extent, but the time is devoted chiefly to the more important diseases caused by the

higher fungi, the life histories of which are studied in detail. Preventive measures are considered in each case, with special reference to the scientific principles underlying their application. An extensive collection of preserved pathological material and a large herbarium of *exsiccatæ* of economic fungi are available. Text, *Fungous Diseases of Plants*, by Duggar.

Laboratory.—Detailed microscopic studies of diseased tissues, and identification of the fungus parasites which cause them, comprise the laboratory work. In the case of physiological diseases, the structural changes induced in the tissues are worked out with the microscope. Laboratory outlines are furnished by the department. Prerequisite: Laboratory work in Plant Physiology II.

10.—PLANT PATHOLOGY II. Elective, winter term. Class work, two hours; laboratory, four hours. Four credits. Elective in the course in general science. Prerequisite: Plant Pathology I.

This is a continuation of Plant Pathology I, involving the study of laboratory and field methods in the investigation of plant diseases, the growing of pure cultures of parasitic fungi, the making of inoculations, etc. This course is especially designed for those who intend to pursue plant pathology as investigators in experiment stations. Lectures and reference reading.

Laboratory.—As described in the preceding course. Laboratory outlines are furnished by the department. Prerequisite: Laboratory work in Plant Pathology I.

11.—EVOLUTION OF PLANTS. Elective, winter term. Class work, four hours. Four credits. Elective in the course in general science. Prerequisite: Economic Botany, class and laboratory work.

Careful consideration is given to the lines along which evolution has proceeded in the plant kingdom, to the relationships of the more important phyla and to the probable derivation of the chief groups of plants. Text, *Evolution of Plants*, by Campbell. Lectures and reference reading.

12.—PLANT PHYSIOLOGY III. Elective, spring term. Lecture, two hours; laboratory work, four hours. Elective in the courses in agriculture and general science. Prerequisites: Plant Physiology I and II.

This course offers opportunity for advanced work upon special problems in plant physiology, to be selected by the department for investigation.

13.—TAXONOMIC BOTANY. Elective, spring term. Class work, one hour; laboratory, six hours. Four credits. Elective in the course in general science. Prerequisite: General Botany.

This course is designed to give biological students a broad training in the systematic relationships chiefly of the flowering plants. Practice is acquired in the use of manuals or keys to floras, and the student is taught especially to recognize the morphological characters which distinguish the principal orders, families and genera of the angiosperms. The course is designed to be a strictly practical one, its purpose being to equip the student with the necessary data for recognizing at sight a large number of the plants of the field, mainly of the higher groups, although some attention is also paid to the identification of ferns, mosses, and liverworts, and of the commoner algae and fungi. Lectures and reference reading.

Laboratory.—The identification, by means of standard manuals and floras, of a large number of native and exotic plants. Considerable field practice is required, and attention is directed to differences in structure which the same species may show under different environments. An endeavor is made to train the student's mind to a broad, comprehensive conception of species characters, using manuals merely as convenient

guides to this end. Laboratory guide, Gray's *Manual of Botany*, seventh edition, revised. Prerequisite: Laboratory work in General Botany.

14.—SEED TESTING. Elective, spring term. Laboratory, two hours. One credit. Elective in the course in agriculture. Prerequisite: General Botany.

The student becomes familiar with the details of structure of the seeds of all the principal races of agricultural plants grown in this region, and learns to distinguish those seeds which are used as adulterants or as fraudulent substitutes. Considerable time is also devoted to the identification of weed seeds and of weed plants, in both the seedling and the adult stages. Practice work is given in making purity and germination tests of seeds, according to the official rules and methods for seed testing. Laboratory outlines furnished by the department.

Chemistry

Professor WILLARD.
Assistant Professor KING.
Assistant Professor WHELAN.
Assistant Professor SWANSON.
Instructor NEWMAN.
Instructor HUGHES.
Assistant GUTSCHE.
Assistant MILLER.
Assistant _____.

All of the industries are becoming more and more dependent for their highest success upon intelligent application of the sciences, and the special sciences are making their greatest progress by tracing their phenomena back to the physical and chemical changes that accompany them. A study of chemistry and physics is therefore essential to any understanding of the processes of nature or of human industry. In the instruction in chemistry, the aim is to insist upon a mastery of the chief concepts of the pure science through the agency of textbook drill, accompanied by demonstrations in the lecture room, and experimental observations by the student himself in the laboratory. As the course proceeds, illustrations of chemical principles are drawn from the industrial processes of the chemical, agricultural, domestic, and other arts, thus impressing upon the mind the practical nature of the study. The ultimate object of instruction in this science is to develop in the student the power to form independent judgments upon the manifold problems of daily life in which chemistry plays a part.

The lecture rooms are amply equipped for experiments and demonstrations, and the laboratories are designed to accommodate 800 students per term in freshman work and qualitative analysis. The laboratories for more advanced work provide space for 100 students, and are well supplied with general and special facilities. The State work in foods, feeding stuffs, and fertilizers, and the chemical investigations of the Experiment Station in soils, crops, animal nutrition, etc., afford unusually good opportunities for students to obtain experience in practical chemistry.

COURSES IN CHEMISTRY

1.—CHEMISTRY I. Lectures and recitations, three hours; laboratory, two hours. Four credits. Required in all courses.

This term's work begins the study of elementary inorganic chemistry, and includes a study of the elements oxygen, hydrogen, chlorine, and their compounds, this being accompanied by theoretical treatment of the subjects of matter, energy, properties of gases, chemical law and theory, solution, electrolytic dissociation, acids, bases, and salts, and chemical change as related to light, heat, and electricity. It is designed, with the succeeding terms, to give the student a knowledge of the fundamental principles of chemistry. As all subsequent progress in this science requires a working knowledge of its principal theoretical conceptions, the principles of nomenclature, the significance of formulas, chemical equations, etc., much attention is given to these, while at the same time the practical uses of the substances, and the processes used in metallurgy, engineering, agriculture, and other arts are emphasized. Newell's *Inorganic Chemistry for Colleges* is used, this term's work covering the first 209 pages. The text is supplemented by lectures and is amply illustrated by experimental demonstrations.

Laboratory.—As far as time permits, the student performs independently experiments touching the preparation and properties of the more important substances. Preference is given to those operations which illustrate important principles, and the student is required, as far as possible, to study experiments in that light. In this, as in all other laboratory work in chemistry, the objects are to illustrate chemical phenomena and to teach care in manipulation, attentive observation, logical deduction, and discrimination and accuracy in recording results and conclusions. The student is required to give the designated amount of time, and a minimum amount of work must be satisfactorily performed in order to obtain credit. *Laboratory Exercises in Elementary Chemistry*, by William McPherson, is used as the laboratory guide.

2.—CHEMISTRY II. Lectures and recitations, two hours; laboratory, four hours. Four credits. Required in all courses.

The work under this head is a continuation of the study of elementary inorganic chemistry, and includes the elements nitrogen, carbon, sulphur, and their compounds, and a consideration of atomic weights, valence, and the classification of the elements. These subjects are included in pages 210 to 355 of Newell's *Inorganic Chemistry for Colleges*.

Laboratory.—The laboratory work of this term is a continuation of that begun in the preceding term.

3.—CHEMISTRY III. Lectures and recitations, three hours; laboratory, two hours. Four credits. Required in all courses.

This work completes the study of elementary inorganic chemistry begun in the preceding terms, and includes the consideration of fluorine, bromine, iodine, silicon, phosphorus, arsenic, antimony, and the metals.

Laboratory.—The laboratory work in this course is a beginning in qualitative analysis, for which *McPherson's Elementary Treatise on Qualitative Analysis* is used as the guide.

4.—QUALITATIVE ANALYSIS. Sophomore year, fall and winter terms. Lecture, two hours; laboratory, four hours. Four credits. Required in the courses in agriculture, veterinary medicine, home economics, and general science. Prerequisite: Chemistry III.

In this course the prime object is to increase the student's knowledge of chemistry as a whole. The standard methods of analytical chemistry are made the basis of a systematic study of the chemical properties of the most important metals, nonmetals, acids, bases, and salts. The teaching of analysis as such is a secondary object, although the student is held to

the exact observations and careful reasoning required in ascertaining the composition of single substances and mixtures. The exercises, which are outlined in a special pamphlet, include a review of the more important topics of inorganic chemistry, in which natural occurrence of elements and compounds, industrial chemical processes, and analytical reactions are seen to be closely connected. The exercises are so arranged as to pass from the simpler to the more difficult ones, and at the same time to facilitate the comparative study of the several cations and anions. The theories of chemistry receive constant application. The effect of the course is to broaden, strengthen, and unify the student's ideas of general chemistry, to enlarge greatly his knowledge of chemical facts, and at the same time to fix many of them in his mind by associating them with the reactions made use of in analytical processes.

Laboratory.—The regular methods of qualitative analysis serve as a basis for a laboratory study of the chemical properties of substances. Laboratory manual, *Qualitative Analysis*, by W. A. Noyes.

5.—ELEMENTARY ORGANIC CHEMISTRY. Sophomore year, winter term. Lectures and recitations, four hours. Four credits. Required in the courses in agriculture, home economics, and general science. Prerequisite: Chemistry III.

A systematic study is made of the simpler examples of the more important classes of organic compounds in their logical chemical relations. Such substances as touch the everyday affairs of life are treated in greater detail. Opportunity is thus afforded to consider the hydrocarbons, alcohols, organic acids, fats, soap, sugars, starch, proteids, and other less known substances. Compounds used for clothing, food, fuel, light, antiseptics, disinfectants, anesthetics, poisons, medicines, solvents, etc., are included. While especial attention is given to the useful organic compounds, the study of others is not excluded, when they contribute to an understanding of the systematic relations existing among the several groups. Any serious study of the biological sciences, or of the arts connected with them, must require this as a foundation, and a knowledge of the properties of organic compounds finds frequent application in engineering as well. The subject is amply illustrated by experiments in the lecture room. Text, Remsen's *Organic Chemistry*, in part, accompanied by lectures amplifying certain parts of the subject.

6.—AGRICULTURAL CHEMISTRY. Sophomore year, spring term, and junior year, fall term. Class work, two hours. Two credits. Required in the course in agriculture. Prerequisite: Qualitative Analysis.

The work of this term consists chiefly of a detailed study of the application of chemistry to agricultural problems, with especial reference to the income and outgo of the elements which determine success or failure in crop production, and hence the agricultural prosperity of a country. The following topics are among those included: the atmosphere, the soil, natural waters, plants, farm manures, commercial fertilizers, crops, feeds, and animal products. Text, *General Agricultural Chemistry*, by Hart and Tottingham.

7.—QUANTITATIVE ANALYSIS I. Sophomore year, spring term, or junior year, fall term. Laboratory, four hours. Two credits. Required in the course in agriculture; elective in others. Prerequisite: Qualitative Analysis.

This consists of simple quantitative exercises, which are planned to give the student a knowledge of the simpler operations in quantitative analysis, as well as to lay the foundation for studies in which such knowledge is required. Quantitative analysis is at the basis of many investigations connected with agriculture, and the course is designed not only to increase the student's knowledge of chemistry, but to give him an appreciation of the value of exact quantitative work.

8.—QUANTITATIVE ANALYSIS II. Elective, junior year, fall or winter term. Laboratory, four hours. Two credits. Prerequisite: Quantitative Analysis I.

This consists of gravimetric determinations of silica, iron, aluminum, calcium, and magnesium in limestone; standardization of quantitative apparatus; preparation of standard acid and alkali solutions of definite normality; and the determination of nitrogen in organic substances. Laboratory guide, *Notes on Quantitative Chemical Analysis*, by C. W. Foulk.

9.—QUANTITATIVE ANALYSIS III. Elective, junior year, winter or spring term. Laboratory, four hours. Two credits. Prerequisite: Quantitative Analysis I.

This consists of the gravimetric and volumetric determination of phosphorus; the use of oxidizing solutions in volumetric analysis; the determination of iron in an ore; and the determination of potassium and carbon dioxide. Students expecting to take this course should plan to take it immediately after completing the work in Quantitative Analysis II. Laboratory guide, *Notes on Quantitative Chemical Analysis*, by C. W. Foulk.

10.—QUANTITATIVE ANALYSIS IV. Graduate or elective, senior year, fall, winter or spring term. For each two hours' work a week for one term, one credit. Prerequisite: Quantitative Analysis III.

In this course the student may specialize on the analysis of foods, feeding stuffs, soils, fertilizers, or dairy products. As far as the student's preparation allows, he may take up the chemical study of a special problem. This applies particularly to graduate students.

11.—CHEMISTRY C. Sophomore year, winter term. Lecture, one hour; laboratory, eight hours. Five credits. Required in the course in civil engineering. Prerequisite: Chemistry III.

This course is designed to give students of civil engineering as much training in qualitative and quantitative analysis as time permits, the special direction given to the work being such as to lead to the greatest amount of practical benefit. Texts, W. A. Noyes' *Qualitative Analysis*, and Lincoln and Walton's *Quantitative Analysis*, supplemented by pamphlets and mimeographed matter.

12.—CHEMISTRY D-I. Junior year, fall term. Laboratory, four hours. Two credits. For students specializing in dairy husbandry. Prerequisite: Quantitative Analysis I.

This course includes calibration of volumetric apparatus, preparation of standard acid and alkali solutions of definite normality, and analysis of milk and butter. Laboratory guide, Lincoln and Walton's *Elementary Quantitative Analysis*, supplemented by special directions.

13.—CHEMISTRY D-II. Junior year, winter term. Laboratory, four hours. Two credits. For students specializing in dairy husbandry. Prerequisite: Chemistry D-I.

The course comprises determination of volatile fatty acids, of soluble and insoluble acids, saponification and iodine number of butter fat. These constants are determined on other fats also, as far as time permits.

14.—HOUSEHOLD CHEMISTRY. Senior year, fall term. Class work, one hour; laboratory, six hours. Four credits. Required in the course in home economics. Prerequisites: Qualitative Analysis and Elementary Organic Chemistry.

This course is designed to give the women in the home-economics course qualitative and quantitative work in the chemistry of the materials most intimately related to their daily life. Air, water, foods, fuel, fabrics, disinfectants, metals, and other materials used in and about the home are the subjects of numerous experiments touching their properties, usefulness and defects.

15.—HUMAN NUTRITION. Junior year, fall term or winter term. Class work, four hours. Four credits. Required in the course in home economics; elective in the course in general science.

This is a course in the chemistry of foods and nutrition, and includes, among others, the following topics: the composition of the body; the composition of foods and methods of investigation employed in their study; the changes that the several classes of foods undergo in cooking and digestion, and the functions that they perform in nutrition; daily food requirements, and the balancing of dietaries; food economy. *Chemistry of Food and Nutrition*, by H. C. Sherman, is used as a textbook, but is supplemented by lectures. Elementary Organic Chemistry and Physiology must precede this course.

16.—PRINCIPLES OF ANIMAL NUTRITION. Graduate or elective, spring term. Class work, four hours. Four credits. Prerequisite: Elementary Organic Chemistry.

This course gives a thorough study of the relations of animals to matter and energy. The methods of research and the results obtained are treated in an extended and scientific manner. Text, *Principles of Nutrition*, by H. P. Armsby.

17-19.—INORGANIC CHEMISTRY I, II, AND III. Graduate or elective; junior or senior year; fall, winter, and spring terms. Class work, three hours; laboratory, four hours. Five credits each term. Prerequisite: Qualitative Analysis.

This course consists of a thorough study of the facts of chemistry and their theoretical interpretation according to the views of the present day. Text, *Introduction to General Inorganic Chemistry*, by Alexander Smith.

20-22.—ORGANIC CHEMISTRY I, II, AND III. Graduate or elective; junior or senior year; fall, winter, and spring terms. Class work, three hours; laboratory, four hours. Five credits each term.

The course includes a careful, systematic study of the aliphatic and aromatic compounds to such an extent as the time permits. Text, *Theoretical Organic Chemistry*, by Cohen.

23-24.—PHYSIOLOGICAL CHEMISTRY I AND II. Graduate or elective; junior or senior year; fall and winter terms. Four hours. Four credits each term. Prerequisite: Elementary Organic Chemistry.

A systematic and thorough study of the synthetic and analytical chemical changes that accompany the physiological processes of animals and plants. The chemical properties of food and body substances and their general and specific functions; the changes that take place in digestion, assimilation, and elimination, and the means by which these are brought about; enzymes and their functions; the blood and lymph; general metabolism and the interrelations of organs are among the important topics studied. Textbook, Abderhalden's *Text-Book of Physiological Chemistry*.

Economics

Professor KAMMEYER.
Instructor _____.

Vocational training alone does not fully prepare a student for his life's work, nor for the acceptable discharge of his duties as a citizen. It is necessary that he should have at least a general knowledge of the social and economic conditions under which he works, in order that he may benefit society as well as himself. The State needs men and women trained for citizenship, and it is the purpose of this department to plan and to direct its work with this need in view.

A departmental library of well-selected books bearing on economics, sociology, and statistics is at the disposal of students, and is used for collateral readings, book reviews, and reports.

1.—ECONOMICS. Sophomore, junior or senior year, fall and spring terms. Class work, four hours. Four credits. Required in all courses except veterinary medicine.

A study of economic principles underlying the phenomena of wealth production, consumption, exchange, and distribution, including a general survey of the State in its relation to industry, transportation, public utilities, insurance, socialism, etc. Instruction by recitations and lectures. Text, Ely's *Outlines of Economics*.

2.—BUSINESS ORGANIZATION. Junior or senior year, winter or spring term. Class work, two hours. Two credits. Required in courses in the Division of Mechanic Arts; elective in the course in general science. Prerequisite: Economics.

A study of individual proprietorship, partnership and corporation as forms of business organization and management; the advantages and disadvantages of each, and legislative restrictions. The selling plans, advertising methods and systems of credits and collections used by typical manufacturing and distributive industries are made the basis of study and reports. Attention is given also to the origin and operation of markets and exchanges, cost accounting, and special systems of wage payment. Instruction is by recitations, lectures, and reports.

3.—AGRICULTURAL ECONOMICS. Senior year, winter term. Class work, four hours a week. Four credits. Optional in the course in agriculture.

This course is intended especially for students pursuing one of the agricultural courses, and in the main is similar to Economics, with the distinction that more time and emphasis are given to such subjects as rent, size of farms, ownership and tenancy, transportation to markets, agricultural credit associations, farm labor, and agricultural problems of an educational and social character. Instruction by recitations, lectures, and reports. Text, Carver's *Rural Economics*.

4.—HISTORY OF ECONOMIC THOUGHT. Elective, fall term. Class work, four hours. Four credits. Elective in the course in general science.

A study of the origin and development of economic ideas prior to the time of Adam Smith, and of systems of economic thought subsequent to that time. The course is designed to supplement course 1 in economics, and the aim is to deepen the insight and broaden the view of the student touching existing economic phenomena and conditions, their origin, logical development and interrelations. Haney's *The History of Economic Thought* is used as a manual, but lectures, assigned readings and reports are the chief basis of instruction.

5.—LABOR PROBLEMS. Elective, fall term. Class work, two hours. Two credits. Elective in the course in general science. Must be preceded by a course in general economics.

The history, organization, functions and legal status of labor unions in the United States and the principal countries of Europe. Statistics and judicial decisions relating to strikes, boycotts, picketing, arbitration, etc., are subjects of study and investigation. The course also includes a study of the various plans that have been proposed and tried for the more equitable distribution of wealth, such as profit-sharing, coöperation, industrial partnership, etc. Instruction by lectures, assigned readings, and reports.

6.—MONEY AND BANKING. Elective, spring term. Class work, two hours. Two credits. Elective in the course in general science.

A study in detail of money, its history and characteristics as a medium

of exchange and standard of value. Bank currency: its nature, forms and limitations. The principal banking systems of the world, their machinery and methods; branch banks, clearing houses, foreign and domestic exchange, etc. Special attention is given to the defects and needs of our own banking system, and to proposed plans for reorganization. A manual such as Scott's or White's *Money and Banking* is used, supplemented by lectures and library work.

7.—PUBLIC FINANCE. Elective, spring term. Class work, two hours. Two credits. Elective in the course in general science.

This course embraces a study of public revenues and public expenditures; the development of tax systems, reforms needed, public indebtedness, budgets, and other phenomena of financial administration. A manual such as Plehn's *Introduction to Public Finance* is used as a basis for recitations. This is supplemented by library work and reports. Must be preceded by a course in general economics.

The English Language

Professor SEARSON.
Assistant Professor OSTRUM.
Instructor RICE.
Instructor LEONARD.
Instructor BOOT.
Instructor CRAWFORD.
Instructor FURLEY.
Instructor BECK.
Instructor _____.

Ability to use language accurately, clearly and concisely is an essential part of the training of every educated person. The work of the Department of the English Language is to acquaint the student with the best standards of English practice, and to encourage him to maintain these standards in all his work. To this end the department offers studies in cultural and technical English and special drills in expressing thought freely and effectively in matters touching the vital interests of the student. The study of the English language is thus made the means of increasing the power and efficiency, and consequently the capacity for enjoyment, of the individual. It is the aim of the department, in co-operation with the technical departments of the College, to increase the knowledge and usefulness of the young workers of the State.

COURSES IN THE ENGLISH LANGUAGE

1.—ENGLISH I. Freshman year, each term. Class work, four hours. Four credits. Required in all courses. Prerequisite: Graduation from a fully accredited high school, with three units in English, or the equivalent.

During the first week of the course, the student is given a series of classroom exercises to test his fitness to pursue the work of the course. Following these exercises, the student is given a rapid, thorough review of the essentials of English, followed by essays on simple themes designed to develop his ability to tell accurately and interestingly what he knows and to describe creditably what he sees. The chief object of the course is to enable the student to use clear-cut, correct English, to express his thoughts readily, accurately, and precisely on topics of vital human interest. Special consultations are held with all students, and special supplementary drills are given to all who need additional help.

2.—ENGLISH II. Freshman year, each term. Class work, four hours. Four credits. Required in all courses. Prerequisite: English I.

This course is a continuation of English I. In addition to continuing accurate drills, careful attention will be given to the making of plans, outlines, and abstracts, and to the proper construction of paragraphs and themes. So far as possible, the student will be shown how to get the most from the lecture or from the printed page, and will be trained to take notes properly. To give a natural incentive to proper oral and written expression, the fields of agriculture and country life, engineering, home economics, applied science, sociology, psychology and general economics are explored freely for topics of keen interest. The course is conducted with the central idea of assisting the freshman to acquire the habit of clear, accurate thought-getting and thought-expression in all his technical work.

3.—COLLEGE RHETORIC I. Freshman or sophomore year, each term. Class work, four hours. Four credits. Required in all except the engineering courses. Prerequisite: English II.

This course is a continuation of the work in English II. It includes a brief review of the essentials taught in English I and English II. In addition, special work in outlining, practical work in abstracting, directed library investigations, reference and bibliography work, are required in order to assist each student to write and to speak effectively along the line of his own special interests and needs. Special drills in readiness and flexibility of thought-expression will be given by requiring a great deal of extemporaneous writing in the classroom. So far as possible, the work will be so arranged as to adapt itself to the special needs of the students of the several divisions.

4.—COLLEGE RHETORIC II. Sophomore year, each term; junior or senior year, fall term. Class work, four hours. Four credits. One term's work required in all except the engineering courses. Prerequisite: College Rhetoric I.

This course includes a brief review of the essentials of thought-expression, library investigations, bibliography work, logical arguments and orations. In addition, class reports upon projected engineering enterprises, explanations of mechanical and chemical processes, descriptions of new inventions by means of drawings and diagrams, special reports of significant agricultural experiments, and practical discussions of problems in home economics, are required. Attention is also directed toward the accurate and effective use of English in business letters, applications, shop reports, specifications, contracts, and bulletins. The work is adapted to meet the special needs of the students of the several college divisions.

5.—SPECIAL ENGLISH. This course is offered each term as supplementary to the courses in the School of Agriculture and in freshman English, and may be required of any student whose written work shows that he is unable to express his ideas clearly and accurately. Students may be admitted to the course by the head of the Department of the English Language upon the recommendation of the instructor and the student's dean. The course consists of special exercises, helps, and consultations, and may be continued in each case as long as is necessary to give the student the assistance needed.

6.—ARGUMENTATION AND DEBATE. Elective, fall term. Class work, four hours. Four credits. Elective in the courses in home economics, agriculture, and general science. Prerequisite: College Rhetoric I.

This course includes a systematic study of the theory of debate; brief-making; classroom practice in debating, in defending propositions, and in extemporaneous speaking; the proper methods of collecting and classifying material, and effective methods of refuting arguments. Special

help is given to those desiring to participate in intercollegiate debates. Consultations, library investigations and special group conferences form helpful laboratory features of the course.

7.—BIBLE ENGLISH. Elective, fall term. Class work, four hours. Four credits. Elective in the courses in agriculture, home economics, and general science. Prerequisite: College Rhetoric I.

This course comprises a study of simple, forceful English based on Bible models. Short illustrative extracts, typical short stories, descriptions, clear explanations, and effective arguments are studied carefully to discover the secrets of simplicity, clearness and power of that great classic.

8.—ENGLISH PRACTICE. Elective, winter term. Class work, four hours. Four credits. Elective in the courses in home economics, agriculture, and general science. Prerequisite: College Rhetoric I.

This course offers advanced work in correct English practice. Definite work is assigned in practical, everyday English. The object of the course is to afford students special advanced training in the use of English. The course is specially planned to meet the needs of those who intend to teach English, and of those who desire to record the results of technical investigations in the most effective form. Work done in other departments may be used as a basis of a part of the laboratory practice of this course. Regular conferences and consultations offer the student an opportunity to secure systematic personal help.

9.—FARM AND HOME ENGLISH. Elective, winter term. Class work, four hours. Four credits. Elective in the courses in agriculture, home economics, and general science. Prerequisite: College Rhetoric I.

This course is designed primarily to teach the plain, practical English indispensable to farm men and women who, by reason of special preparation for their work, expect to become leaders. This is a practice course in the essentials of useful, technical English, letter writing, farm reading and writing, and farm and club writing and speaking.

10.—BUSINESS ENGLISH. Elective, spring term. Class work, four hours. Four credits. Elective in the courses in agriculture, home economics, and general science. Prerequisite: College Rhetoric I.

This course comprises a thorough review of business letter-writing, exercises in writing contracts, notes, mortgages, wills, orders, sale bills, specifications, model story advertisements of farm produce, and a practice study of other forms commonly used in connection with the business of farm and home.

11.—APPLIED ENGLISH. Elective, spring term. Class work, four hours. Four credits. Elective in the courses in home economics, agriculture, and general science. Prerequisite: College Rhetoric I.

This course is a continuation of the one in English practice, and includes a study of correct standards and usage as applied in all branches of ordinary technical research. Definite assignments, carefully directed practice and advanced drills, and group studies showing the identity of higher theory and practice in English, are special features of the course. A series of the best texts will be used as the reference basis of the course.

English Literature

Professor BRINK.
Assistant Professor BEALL.
Acting Assistant Professor McDONALD.

An ultimate purpose of the instruction in literature is to train students in the art of effective writing. No better way has yet been found for the accomplishment of such an end than the study and emulation of the great writers of the language. The courses seek to give the student an understanding of the nature and characteristics of literature in its leading forms, to develop in him a taste for noble expression and a desire to attain high ideals in his own writings, to develop in him the ability to judge with confidence the literary qualities of any given work, and through sympathetic study of masterpieces to give him some idea of the leading authors.

In most of the courses in literature the work is pursued by means of a combination of lectures, classroom study, and seminary investigation, accompanied, of course, by frequent written reports for criticism and discussion. The literature is read at first hand, and the student is required to interpret for himself as far as possible, with the idea that it is more profitable for him to know an author than to know what some one has said about that author. The extensive and intensive methods are combined—wide reading to obtain literary atmosphere and breadth of view; critical study to develop accuracy and insight.

COURSES IN ENGLISH LITERATURE

1.—ENGLISH LITERATURE. Sophomore year, winter or spring term. Four hours a week. Four credits. Required in the courses in the Division of Mechanic Arts. Prerequisite: College Rhetoric I.

This course gives a brief review of the rise and development of English literature, with library study of periods and typical authors. Lectures are given on the nature of literature; the nature of poetry; linguistic and race contributions to the literature; the great literary periods. The work includes class study, reports, and the study of masterpieces.

2.—ENGLISH LITERATURE I. Sophomore or junior year, winter term. Four hours a week. Four credits. Required in the courses in industrial journalism, general science, and home economics; elective in other courses. Prerequisite: College Rhetoric I.

This course comprises an outline of the history of the language and literature. The students are required to prepare dissertations, both oral and written, on periods and types of literature, on representative writers, and on significant movements. Lectures are delivered on the following subjects: What is Literature? What is Poetry? Forms of Poetry; Criticism; The Beginnings of English Fiction; The Age of Scott, Burns, and Wordsworth; Tennyson and His Age. Members of the class report the lectures and apply principles in the actual study of suitable selections. The class carries on extensive study of such writers as Shakespeare and Thackeray out of class, and intensive study of somewhat difficult poetical selections in class, with reports and informal discussions.

3.—ENGLISH LITERATURE II. Sophomore or junior year, spring term. Four hours a week. Four credits. Required in the courses in industrial journalism, general science, and home economics. Prerequisite: English Literature I.

This is a continuation of English Literature I. The work includes:

some plays of Shakespeare by the seminar method; reports and discussions; principles of Shakespearian criticism; linguistic elements and tendencies of the Lowland Scotch, with illustrations from the poetry of Burns. Critical study is made of typical productions of such writers as Shelley, Burns, Thackeray, Tennyson, Browning. The principles of Browning criticism are taken up.

4.—THE STUDIES IN ORATORY. Elective, fall term. Four hours a week. Four credits. Elective in courses that offer electives. Prerequisite: College Rhetoric.

This course is a study of that type of oral discourse the ultimate purpose of which is to move the determination of hearers. The distinctions between spoken and written discourse are drawn. The class examines as many great speeches, especially of modern orators, as the time will permit. The course further includes the logic of oratory; study of oratorical style; and practice in the writing of speeches with a view to effective and persuasive utterance.

5.—THE ENGLISH DRAMA. Elective, winter term. Four hours a week. Four credits. Elective in courses that offer electives. Prerequisite: College Rhetoric I. Given in 1913-'14, and in alternate years thereafter.

This is a study of the nature of the romantic, as distinguished from the classical, school of this great type of literature. The course is devoted mainly to Shakespeare, with reports and informal lectures on the drama before his time, and the reading of one or two plays of the subsequent period. The seminar method mainly is employed. The technique of the drama is studied, including character analysis, thought interpretation, and plot development.

6.—THE ENGLISH NOVEL. Elective, winter term. Four hours a week. Four credits. Elective in courses that offer electives. Prerequisite: College Rhetoric. Given in 1912-'13, and in alternate years thereafter.

This course is a study of the beginnings and development of this order of fiction; the laws of its art; its leading types, including the society novel, the historical novel, the novel with a purpose, the psychological novel, etc.; how to judge a novel. As many books as time will permit are read from typical authors, such as Jane Austen, Lytton, Scott, Dickens, Thackeray, Eliot, Charles Reade and others. The scientific method is followed, and the aim is to make the course as useful as possible to all who read novels and wish to make such reading profitable as well as interesting.

7.—NINETEENTH CENTURY LITERATURE. Elective, spring term. Four hours a week. Four credits. Elective in courses that offer electives. Prerequisite: College Rhetoric I. Given in 1913-'14, and in alternate years thereafter.

This course is a study of the great writers of the Victorian period. Some attention is given to the Romantic Revival in English poetry, but most of the time is devoted to a first-hand study of Carlyle, Tennyson, Wordsworth, Browning, Shelley, and other writers of the period, who either expressed the life of their time or were leaders in shaping the life of their own or of subsequent years.

8.—AMERICAN LITERATURE. Elective, spring term. Four hours a week. Four credits. Elective in courses that offer electives. Prerequisite: College Rhetoric. Given in 1912-'13, and in alternate years thereafter.

A rapid survey is made of the rise and development of American authorship from colonial times to our own day, with study of the lives, and criticism of the works, of representative men of letters, and intensive reading of their works so far as the time will permit. The transcendental movement and the Brook Farm experiment are considered. Seminar study is made of some of the great novels, longer poems, and speeches. The course includes Emerson's essays and poems.

Entomology

Professor DEAN.
Instructor TANQUARY.
Instructor MERRILL.
Assistant MCCOLLOCH.

In all courses a special effort is made to make the student realize that he is studying living things which form a part of his daily environment, and upon which his welfare in many cases vitally depends. In courses in which both class and laboratory instruction is given, the closest correlation is striven for, and wherever possible the same form is studied simultaneously in laboratory and class. The student is led to integrate his classroom knowledge with local animal life by means of frequent and carefully planned field excursions, and by the free use of vivaria in laboratory and museum. The courses offered are intended to awaken in the student a keen appreciation of the general principles underlying insect life, of the life economy of the more beneficial as well as of the more injurious species, and of the general principles governing methods for their control.

Standard anatomical charts, a representative collection (especially of local species), a high-grade lantern for the projection of lantern and microscope slides, a large and excellent series of lantern slides (many of them colored), and a series of microscope slides are available for illustration. (The lantern is used also for zoölogy and geology.) Compound and dissecting microscopes sufficient for the needs of laboratory classes have been provided.

COURSES IN ENTOMOLOGY.

1.—GENERAL ENTOMOLOGY. Junior year, spring term. Class work, three hours; laboratory, two hours. Four credits. Required in the agricultural courses. Prerequisites: General Zoölogy I and II.

This is a study of the elementary anatomy and physiology of insects, complete enough to give a thorough understanding of the life history and habits of the most important species and the general principles upon which the control of these economic forms is based. It is a study of the more important general facts about insects as a class; the main characters of the different orders and groups; how they have fitted themselves to survive and multiply; and how the structure and habits of one group render it susceptible to certain measures of control, while in other groups entirely different measures are necessary. The class work consists of lectures and of text and special reference study.

2.—INSECT MORPHOLOGY. Senior year, fall term. Class work, one hour; laboratory, six hours. Four credits. Elective in the courses in agriculture and general science. Prerequisite: General Entomology.

This is a study of the external anatomy of insects belonging to all the larger and more important orders and of the internal anatomy of one or two types.

3.—HORTICULTURAL ENTOMOLOGY. Senior year, winter term. Class work, two hours. Two credits. Elective in the course in agriculture. Prerequisite: General Entomology.

This is a study of the most important insect pests of orchard, garden, and forest, and of standard methods for controlling their ravages. The class work consists of lectures and the study of references.

4.—HOUSEHOLD ENTOMOLOGY. Senior year, winter term. Class work, two hours. Two credits. Required in the course in home economics. Prerequisites: General Zoölogy I and II.

This is a study of the elementary structure and physiology of insects complete enough to give a clear understanding of the life history, habits and methods of control of the principal insects injurious to house, garden, lawn, and human health. The course consists of reference study and a series of lectures.

5.—TAXONOMY OF INSECTS. Elective, winter term. Laboratory, eight hours. Four credits. Elective in the course in general science. Prerequisites: General Entomology and Insect Morphology.

This is a study of the general principles of the classification of representative insect forms. The purpose of this course is so to familiarize the student with the literature, methods, and ideals of classification that he will be able expeditiously to identify forms unknown to him and to pursue advanced taxonomic studies.

6.—GENERAL ECONOMIC ENTOMOLOGY. Elective, spring term. Class work, three hours; laboratory, two hours. Four credits. Elective in the course in general science.

This is a study of the life economy of the more important economic insects, of methods to be used in dealing with them, and of the literature of economic entomology. The student is made familiar with our present knowledge of the most important of our injurious insects, with the sources of economic literature, and with methods commonly used in the investigation of problems in economic entomology. The class work consists of lectures, and of text and special reference reading. Prerequisite: General Entomology.

Laboratory.—The laboratory work consists of the formation and study of a collection of injurious insects, and in insect breeding. This work naturally involves much field study, in the course of which the student gains a first-hand acquaintance with the more important injurious insects at home in nature.

7.—RESEARCH IN ENTOMOLOGY. The special student approaching graduation, if willing and capable, is drawn into the research work of the Experiment Station during the summer vacation, and during his last school year is encouraged to undertake the solution of a problem of his own. By this means his information is integrated with the practical problems which he must later meet. Prerequisites: General Entomology, and General Economic Entomology.

Geology

Professor NABOURS.
Instructor NEWMAN.

By use of abundant illustrative material, a special effort is made to make the student realize that he is dealing with natural forces which intimately affect his own well-being and that of his fellows. So far as conditions permit, the agencies that have made the earth what it is are observed and studied in the field. The purpose of these courses is to arouse in the student an appreciation of the general principles underlying the structure and formation of the earth.

Some charts, a large and excellent series of lantern slides, a representative collection of fossils and minerals, and a surrounding country exhibiting considerable variety of hill and valley, are available for illustrative purposes.

COURSES IN GEOLOGY

1.—GENERAL GEOLOGY. Junior year, fall or spring term. Class work, four hours. Four credits. Required in the course in agriculture; elective in the course in general science.

This course consists of a brief study of the underlying principles of structural, dynamic and historical geology. The class work consists of lectures, and of the study of a text and references.

2.—ENGINEERING GEOLOGY. Junior year, spring term. Class work, four hours; laboratory, four hours. Six credits. Required in the course in civil engineering.

The class work in this subject consists in a study of the general principles of structural and dynamic geology, and of rocks in respect to their mineral composition, structural properties, changes in weathering, etc. It is given by lectures, textbook and references. Text, *Geology for Engineers*, by R. F. Sorsbie.

Laboratory.—The laboratory work comprises the observation and description of such structural and dynamic features as the locality affords, and a study of the principal rocks, and their mineral constituents.

German

Professor CORTELYOU.
Instructor HEILMAN.

In whatever direction the modern student turns his energies, a practical knowledge of German is found to be very useful—often quite indispensable. In the sciences, in the arts, and in literature, much of the newest and best work appears in German, so that he who would keep abreast of the times is forced to acquire at least the rudiments of the language. It is desired that the work of this department shall be as practical as possible, without, however, failing to encourage a fondness for German literature. The plan of instruction in general is a combination of the grammatical and conversational methods, each of which has its own special advantages.

A number of literary and scientific periodicals published in German are received by the College library, and afford the student a practical opportunity to amplify his knowledge of the language as derived in the classroom.

COURSES IN GERMAN

1.—ELEMENTARY GERMAN I. Sophomore year, fall or winter term. Class work, four hours. Four credits. Required in the course in home economics; elective in other courses.

After two periods given to the acquisition of the sounds of the German letters, the student at once begins reading. Vocabularies are learned from the outset, while grammar is acquired gradually through reading. Oral and written work and simple conversational exercises begin with the first reading lesson. In the work of this term there is included the study of articles, prepositions, declensions of pronouns, the indicative mode of the verb, and sentence order. Frequent reviews enable the student to digest the facts presented, while the abundant conversation and written work subserves the same end. Text, Becker and Rhoades' *Elements of German* (first twenty-five lessons).

2.—ELEMENTARY GERMAN II. Sophomore year, each term. Class work, four hours. Four credits. Required in the course in home economics; elective in other courses. Prerequisite: Elementary German. The remaining important points of grammar are studied. Students are repeatedly drilled on the grammatical constructions already emphasized in Elementary German I. The general plan of the work is the same as in the preceding term. Essential facts of grammar are insisted upon, but German is taught as a living language. Conversational exercises in German and written translations from English into German are frequent. Text, Becker and Rhoades' *Elements of German* (completed).

3.—GERMAN READINGS. Sophomore year, each term. Class work, four hours. Four credits. Required in the course in home economics; elective in other courses. Prerequisite: Elementary German II.

This course embraces readings of dialogue selections which deal in detail with German life, customs, history, and mythology. A few of the best and most popular song poems also are studied. Grammatical drill is continued, with occasional sight readings and translations into German. Conversations are based on the readings. Text, Bacon's *Im Vaterland*.

4.—GERMAN COMEDIES. Elective, fall or winter term. Class work, four hours. Four credits. Elective in the courses in general science, home economics, and agriculture. Prerequisite: German Readings.

The course comprises the reading of recent one-act comedies of literary merit, and of a realistic, lively, and cleanly humorous nature, including the following: Julius Rosen's *Ein Knopf*, Gustav von Moser's *Ein amerikanisches Duell*, Hugo Mueller's *Im Wartesalon erster Klasse*, and Emil Pohl's *Die Schulreiterin*. Exercises in conversation and sight reading are occasionally introduced. Text, Manley and Allen's *Four German Comedies*.

5.—SCIENTIFIC GERMAN I. Elective, fall term. Class work, four hours. Four credits. Elective in the course in agriculture. Prerequisite: German Readings.

This course is designed as an introduction to the vast field of scientific publications appearing in German. It consists chiefly in translating miscellaneous scientific articles written in simple language. Texts to be selected.

6.—SCIENTIFIC GERMAN II. Elective, winter term. Class work, four hours. Four credits. Elective in the course in agriculture. Prerequisite: Scientific German I.

This is a continuation of the preceding course. The subject matter is here, however, restricted to the field of agriculture. Agricultural bulletins which have recently appeared in Germany are read. Texts to be selected.

7.—GERMAN PROSE I. Elective, winter term. Class work, four hours. Four credits. Elective in the courses in general science and home economics. Prerequisite: German Comedies.

This is a practical course designed to give the student an intimate knowledge of everyday German as used among the Germans in their varied activities. The following are studied in this course: visits; the various stores; restaurants, and drinking customs; meals, and expressions used at table; boarding houses and hotels; the family, weddings, marriages, etc.; dress; the school system; religion and church life; divisions of society, occupations; money, measures, and weights; festivities; traveling; the postal system, the telegraph, the telephone; the city in general; Berlin and cities of the provinces; in the country; the German empire; the military system; conversational phrases; the best German; everyday German. There are occasional sight translations, and some conversational work is done. Text, Kron's *German Daily Life*.

8.—GERMAN PROSE II. Elective, spring term. Class work, four hours. Four credits. Elective in the courses in general science and home economics. Prerequisite: German Comedies.

This course is designed to give the student facility in the rapid translation of fairly easy prose. A number of modern short stories are read. Besides the more formal work, there are eight translations of easy selections. Text, Allen and Blatt's *Easy German Stories*, Vols. I and II.

9.—GERMAN CLASSICS. Elective, spring term. Class work, four hours. Four credits. Elective in the course in general science. Prerequisite: German Prose I or II.

This is a course introductory to a study of the German classics. Two or three of the simpler works of classic authors, such as Lessing's *Minna von Barnhelm* and Goethe's *Hermann und Dorothea*, are translated in the work of this term. Textbooks: Lessing's *Minna von Barnhelm*, edited by von Minckwitz and Wilder, and Goethe's *Hermann und Dorothea*, edited by Allen.

10.—TEACHERS' GERMAN. Elective, spring term. Class work, four hours. Four credits. Elective in the course in general science; elective, optional with German Prose II, in the course in home economics.

In this course a rapid but thorough review of the grammar is given, and composition work is carried on in connection with it. Eight translations and conversation also occupy part of the class period. Text, Bierwirth's *Elements of German*, and mimeographed matter furnished by the department. Prerequisites: At least five terms of college German or its equivalent. Germans who have not had the formal preparation for this course may be assigned to it upon obtaining the consent of the head of the department.

History and Civics

Professor PRICE.
Instructor TAYLOR.
Instructor ILES.
Instructor JAMES.
Assistant REYNOLDS.
Assistant GORDON.

The Department of History and Civics offers nineteen different courses, as described below. Six of these are offered in the vocational schools, and are to be taken in the order designated, though each of these subjects is taught practically every term. The department is well equipped with maps and charts, and has, all things considered, an unusually strong library.

Training for citizenship, breadth of view, historic-mindedness, fairness of judgment, and general culture are constant aims of each course offered by the Department of History and Civics. As a result of the training received in these courses, the student is better prepared to understand and appreciate the institutions in the midst of which he lives and of which he is a part. He is also prepared to act more wisely his part as a leader in good citizenship wherever his lot may be cast.

COURSES IN HISTORY

1.—ADVANCED ENGLISH HISTORY. Freshman or sophomore year, spring term. Class work, four hours. Four credits. Required in the courses in industrial journalism and general science; elective in the course in home economics.

This course traces the story of the growth of England from the Britain of the earliest time to the British empire of to-day. The political history is clearly traced, but emphasis is laid upon the constitutional development, and the practical working of the present government is carefully studied. Much emphasis is given to the industrial and social development of the people, especially to the more recent industrial revolution. One of the especially interesting features of this course is the study of England's institutions and government as her colonial empire emerged, and the conditions under which the United States of America became independent of England. While this is primarily a textbook course, with Cheyney's *Short History of England* as the text, supplementary reading is required, especially from Green's *Short History of the English People* and Cheyney's *Industrial and Social History of England*. As far as the limited time permits, lectures are given on contemporary continental institutions, movements, and conditions.

2.—FRENCH HISTORY. Elective, fall term. Class work, four hours. Four credits. Elective in the courses in home economics and general science.

The story of the growth of the French nation is traced from the days when Gaul was a Roman province, through the fall of Rome and the German conquest to the development of the Christian church and of the institution of feudalism. Then occurs a study of the Crusades, of the formation of the French nation, and of the beginnings of absolute monarchy, to the time of the emergence of France into a great European power. There follows a survey of the Hundred Years' War, of the Protestant Revolution, of the religious civil wars, and finally of the monarchy under Louis XIV. The study of the old régime in France, of the French Revolution, of Napoleon, and of the new nation, brings this course to the point where the course in Modern Europe begins. Text, Adams' *The Growth of the French Nation*, supplemented by special library assignments, and by lectures on medieval institutions.

3.—MODERN EUROPE. Elective, winter term. Class work, four hours. Four credits. Elective.

This is a study of the evolution of the modern European nations out of eighteenth century conditions, especial emphasis being laid on the period since the French Revolution. A study is made of the principal features of their present governments as actually conducted, together with the leading questions that are now agitating the several European states. An investigation is also made of existing international relations, and of the more important problems of the modern world, such as the Turkish problem, China, and the partition of Africa. Text, Robinson and Beard's *Development of Modern Europe*, Vol. II, and readings.

4.—ADVANCED INDUSTRIAL HISTORY. Sophomore year, fall term, or junior year, winter term. Class work, four hours. Four credits. Required in the courses in the Division of Mechanic Arts. (This course is also incorporated in courses 5 and 6.)

This course covers—

First. A study of the physical geography, geology, climate, etc., of the American continents and how these have affected our history and institutions.

Second. A study of the discovery and colonization of America—the impelling motives, the life, occupations, religion, psychological temperament, political institutions, etc., of the people; and the attitude of the mother country toward colonization and the colonists (especially the colonial policy with respect to the occupations and industries of the people) and the reasons for this policy. A careful study is made of the later history of immigration as to its causes and its volume, its character and direction, and its effect on our industries, politics, and institutions.

Third. The influence of the frontier on American history and development. The growth of the great West, and of the spirit and institutions there engendered, is traced. The effect of the abundance of free land, of the public educational system and of the life of the frontier on the evolution of typical American citizenship are considered. Present-day irrigation—its needs, methods, and advantages—is also dealt with.

Fourth. A study of the South before the war (under slavery), and of the new South as it has been developing since the war, including a comparison of the South with New England and the West.

Fifth. A study, running throughout the course, of the life and the industries or occupations of the people—how they were making their living and how they lived. This includes a study of the evolution of agricultural methods, of the growth of the mining and manufacturing industries, of the development of transportation facilities; our maritime shipping interests; inventions, such as the sewing machine, the reaper, the steam engine, and the telegraph. It includes a study of the growth of our cities as a combined result of the operation of natural trade routes and of the exhaustion of our free lands, together with the effect of the development of manufactures and transportation facilities.

Finally. A review of the leading facts in the political history of the nation. An attempt is made to appreciate the influence of the above-suggested factors on political parties and party issues—*e. g.*, tariffs, internal improvements, expansion and slavery—and to appreciate the attitude of sections and of individual leaders toward these issues. This course is based on an American history notebook, prepared by the department; but special use is made of such texts as Bogart's *Economic History of the United States*, Coman's *Industrial History of the United States*, and Simon's *Social Forces in American History*. Lectures, assigned readings, and reports.

5.—AMERICAN HISTORY I. Junior or senior year, fall or winter term. Class work, four hours. Four credits. Required in the courses in general science, home economics, and industrial journalism; optional in the course in agriculture. (This course incorporates the first part of Advanced Industrial History.)

This is an advanced course in the political, constitutional and industrial history of America to 1845. It is introduced by a study of the conditions leading to discovery of America, the causes of colonization, what the colonists found in America, and the development under British control of such matters as industries, labor, agriculture, education, and government. Next, a study is made of the results, or effects, of the French and Indian War, and of the causes and conditions that led to the war of American independence. The Treaty of 1783, the governmental, political, and industrial conditions during the confederation period; the Convention of 1787, and the struggle for the adoption of the new constitution, are carefully examined. The following are the lines of our national history that are especially studied: the establishment of the nation and the organization and functions of the various departments of its government; the important presidential elections; the financial measures of Hamilton; taxation, banks, internal improvements; history of political parties, their issues and their leaders; foreign relations and the consequent links connecting Europe and America, as in the case of the Monroe doctrine; the slavery question—compromises, the laws and the constitution; nullification and secession throughout our history; annexation and the government of territories; national boundaries; the growth and development of the West, with a study of its influence on our national character and history. This is a library course, and each student uses an American history notebook of topics and references prepared by the department, as an aid to larger, more definite and more thorough work. American Government is a prerequisite for this course, except by special permission.

6.—AMERICAN HISTORY II. Senior year, each term. Class work, four hours. Four credits. Required in the course in industrial journalism; elective in other courses.

The work of this term continues the course in American History I down to the present time. It includes a study of the annexation of Texas and the Mexican War, with the resulting slavery issue; the compromise of 1850; the Kansas-Nebraska bill and the early Kansas struggle "to the stars through difficulties," including the various constitutions and the final admission to statehood; the origin of the Republican party; the election of 1860; secession; a comparative study of the North and the South before, during, and after the war; a study of some leading features of the war, including financial questions and foreign relations; reconstruction—political, social, and industrial; presidential elections, especially that of 1876; and finally, a study of the Spanish War and of America's new position as a world power. The American history notebook is continued. Emphasis is given to the industrial phases of our history, in an effort more clearly to understand and appreciate the present industrial age. This course incorporates the latter part of Advanced Industrial History. Prerequisite: American History I.

7.—EUROPEAN INDUSTRIAL HISTORY. Senior year, spring term. Class work, four hours. Four credits. Elective in the courses in the Division of Agriculture.

This course includes especially the industrial and social history of England, the industrial life and institutions of the middle ages, and a survey of the most important phases of the industrial conditions in modern Europe, and in China, Japan, and the Philippines. It includes the essential features of the history of civilization—the chief elements in the story of human progress. Based primarily on such texts as Cheyney's *Industrial and Social History of England*, and Innes' *England's Industrial Development*. Supplemented by lectures and reference work.

8.—HISTORY OF HOME LIFE AND THE LAW OF DOMESTIC RELATIONS. Junior or senior year. Class work, four hours. Four credits. Elective in the course in home economics.

The character of this course is suggested by the title. It certainly includes essential features of the history of civilization, and traces the story of human progress from the dawn of history to the present moment. The course is now in preparation, and will be offered in the near future. It will be based on a combination of texts, lectures, and library readings.

9.—KANSAS HISTORY. Elective, spring term. Class work, two hours. Two credits.

This course covers the history of Kansas from the beginning down to the present time, with emphasis on the period of statehood. The conquest of the frontier, the building of the state, and the social, industrial, and political advance to the present day are studied. This is a library course, based on outlines and references furnished by the department.

COURSES IN CIVICS

10.—AMERICAN GOVERNMENT. Junior or senior year, fall, winter or spring term. Class work, four hours. Four credits. Required in the courses in agriculture, home economics, general science, and industrial journalism.

This course in civics, or actual government, reviews definitely the fundamental principles and operations of our state and national governments, including the essential principles of constitutional law, but gives special emphasis to the actual present-day conditions and movements in our governmental and political life. Among the subjects especially studied are the initiative and referendum, suffrage and primary elections,

the recall, city government and government of territories, the regulation of commerce, conservation of national resources, national defense, taxation and finance, the actual methods of congressional activity, and the function, organization, power, and importance of political parties in our government. The course is primarily based on such texts as Beard's *American Government and Politics* and Hart's *Actual Government*.

Throughout this course special and definite attention is given to recent and current events in governmental activities.

11.—**BUSINESS LAW.** Junior year, winter or spring term. Class work, two hours. Two credits. Required in all the courses in the Division of Mechanic Arts; elective in other courses.

This course is planned to give, primarily, a definite knowledge of the essentials of the law of contracts, followed by a briefer study of agency, bailments, and carriers, the law of sales and of negotiable instruments; secondly, the elements of the law of real property, including study of deeds, mortgages, leases, franchises, rights of way, and water rights; finally, a brief study of patent rights and of torts, especially the law of negligence. Text, Huffcut's *Elements of Business Law*.

12.—**FARM LAW.** Elective, spring term. Class work, two hours. Two credits. Elective in the course in general science and in the course in agriculture.

This course outlines the following subjects as far as the time permits:

First. The title to the farm—deeds, etc.; boundaries of the farm—fences, etc.; water rights, including irrigation; police power of the State—quarantine, destruction of diseased animals, pure food; live stock—liability of owner, trespassing animals, estrays. *Second.* Contracts, including hired help, etc.; farm crops and their ownership; renters; sales, including warranty, etc.; factors, or commission merchants; common carriers, such as railroads; insurance. The course is based on Green's *Law for the American Farmer*, supplemented by the Kansas statutes.

13.—**INTERNATIONAL LAW.** Elective, winter term. Class work, two hours. Two credits. Elective in the course in general science.

The fundamental principles of international law and international relations, and rights and obligations, public and private, in time of peace and in time of war, are studied, especially in the light of recent developments, such as the Hague conferences. Text, *Wilson on International Law (Hornbook Series, 1910)*.

Industrial Journalism

Professor DILLON.
Assistant SMITH.

The purpose of the course in industrial journalism is to give greater facility in the use of English, with especial reference to the demands of newspapers, farm publications and magazines, in disseminating information concerning agriculture and the industries generally.

While instruction in industrial journalism does not begin until the junior year, students desiring to take it must come prepared with the necessary training in English and other fundamentals of such a course. They will be required, also, to conform to a schedule of optional courses particularly suited to this profession, and certain to be valuable to them after they leave college. Special students with the necessary prerequisites will be admitted.

A series of lectures describing the theory and practice of journalism is continued throughout the two years. Especial emphasis is given to the industrial branch of the profession. A part of every lecture hour may be used for criticism or special instructions to the class.

COURSES IN INDUSTRIAL JOURNALISM

1.—ELEMENTARY JOURNALISM. Junior year, fall or spring term. Class work, two hours. Two credits. Required in the courses in industrial journalism and agriculture; elective in other courses.

In this course the students learn the first principles of the profession as they are acquired in actual service. Examples of industrial writing, good and bad, are presented for consideration; farm journals and their ideals and requirements are discussed; and the students are told just what to do and how to do it under given circumstances.

2.—FARM WRITING. Junior year, winter term. Class work, two hours. Two credits. Required in the course in industrial journalism; elective in other courses. Prerequisite: Elementary Journalism.

This course contemplates the most careful instruction in preparing material for publication in daily and weekly papers throughout the State, and in farm journals. The work covers the principal points and objections noted by editors of both classes of publications, and gives particular attention to suggestions leading to the development of attractive features in stories of agriculture, home economics, and mechanic arts, and in campus news. The ordinary laboratory or practice work incidental to assignments is continued. Attention is given live-stock advertising and illustrations.

3.—GATHERING NEWS. Junior year, spring term. Class work, two hours. Two credits. Required in the course in industrial journalism; elective in other courses. Prerequisite: Farm Writing.

The lectures and work of this course are designed to familiarize students with the requirements of newspapers in small cities and towns in respect to the matter of gathering and presenting current events. A part of the term is given to consideration of the principles and problems of country journalism.

4 to 9.—JOURNALISM PRACTICE I TO VI. Junior and senior years; four hours. Two credits, each term. Required in the course in industrial journalism; elective in other courses. The prerequisite for each term is the work of all preceding terms in Journalism Practice.

Journalism practice consists in gathering information, or news, to which the students have been assigned, and in writing the stories, or articles, in the department workroom. Assignments are given at regular periods and must be accounted for exactly as in a newspaper office, or as in any college course in which certain tasks are performed in the presence of the instructors. The students write articles for *The Kansas Industrialist*, the official paper of the College, and for farm journals and newspapers, describing the work of the Experiment Station, and the industrial work of the various departments. At least one article, and in emergency, two or more articles, must be written every week. In proportion as they advance, the students do more important laboratory, or practice, work. They are required to write special stories and editorials, and in every possible way conduct the actual business of a newspaper office. References are looked up, and special articles prepared for publication under personal supervision. Special instruction is given in the use of technical and semitechnical expressions in writing, with a clear understanding of their meaning. In this way students learn to avoid many of the errors inevitably made in newspaper articles written by persons unfamiliar with the phraseology of the professions.

10.—**COPY READING.** Senior year, fall term. Class work, two hours. Two credits. Required in the course in industrial journalism; elective in other courses. Prerequisite: Gathering News.

This work teaches the students how to detect, avoid and correct the common errors in newspaper writing. The lectures cover practically every point encountered in many types of publications. In this part of the course students learn how to emphasize in the headlines the most important and interesting features of a manuscript. Special attention is given advertising, type faces, and the work of making up a newspaper.

11.—**NEWSPAPER LAW.** Senior year, winter term. Class work, two hours. Two credits. Required in the course in industrial journalism; elective in other courses. Prerequisite: Copy Reading.

This course is intended to supply the most valuable instruction in the law covering the conduct of newspapers and other publications, particularly with respect to libel. One half the class periods are given to the history of newspapers in the United States and to the law of copyright. The ethics of the profession, invaluable to every one desiring to write for the press, are discussed. The students continue their agricultural and industrial writings as in the other terms.

12.—**EDITORIAL PRACTICE.** Senior year, spring term. Class work, two hours. Two credits. Required in the course in industrial journalism; elective in other courses. Prerequisite: Newspaper Law.

A cultural course designed to broaden the student's viewpoint as to the conduct of the editorial department of newspapers and farm journals, as to the theories that underlie its work, and as to the factors and influences that control it. To encourage the formation of opinion and to stimulate thought, acceptable contributions written by the students are printed in the College paper. A part of the term is given to a study of the history of agricultural journalism in the United States.

Library Economy

Librarian SMITH.
Reference Librarian DERBY.
Research Assistant, _____.

The library supplements the work of every department of the College. It is a storehouse of knowledge for every student. It supplies information and the latest results of scientific research for every instructor. The library is thus essential to the College, forming, as it were, a center from which its various activities radiate.

In order that the library may perform its functions with the highest degree of efficiency it is necessary that instruction be given regarding its use. With this thought in mind a course is offered the purpose of which is to familiarize the student with scientific, up-to-date methods in the use of books and to acquaint him with the best general reference books as well as with standard works on various subjects. Placed at the beginning of his College course it should tend to increase largely his efficiency in study throughout the entire course.

COURSES IN LIBRARY ECONOMY

1.—**LIBRARY METHODS.** Freshman or sophomore year; fall, winter or spring term. Class work, one hour; laboratory work, two hours. Two credits. Required in the courses in general science, agriculture, and home economics.

The course consists of lecture and laboratory work on classification and arrangement of books in the library; card catalogues; the principal works of reference, such as dictionaries, encyclopedias, atlases, handbooks of general information, handbooks of geography, history, literature, economics, quotations, statistics, etc.; public documents and their indexes; indexes to periodicals; trade, national and subject bibliographies, etc. Instruction is given also in methods of indexing current technical reading for purposes of future reference.

2.—LIBRARY METHODS E. Freshman year, spring term. Laboratory work, two hours. One credit. Required in all courses in the Division of Mechanic Arts.

This course is similar to that listed above, but consists of laboratory work only. It is not an equivalent of Library Methods, and may not be substituted for it.

Mathematics

Professor REMICK.
Assistant Professor ANDREWS.
Assistant Professor WHITE.
Instructor ZEININGER.
Instructor CLEVENGER.
Instructor PORTER.
Instructor STRATTON.
Assistant HOLROYD.
Assistant FEHN.
Assistant MEYER.
Assistant McNair.

The courses in mathematics are offered primarily with the following ends in view: (1) The attainment of mental power and accuracy in the interest of general culture; (2) the acquirement of facts and processes that will provide the student with valuable tools for further scientific and technical study.

Subfreshman and freshman courses are offered each term, sophomore courses at least twice within the year.

COURSES IN MATHEMATICS

1.—PLANE TRIGONOMETRY. Freshman year, fall term. Four hours. Four credits. Required in the courses in engineering, architecture, and general science. Prerequisite: Solid Geometry and Algebra IV.

This course treats of the functions of acute angles, right triangles, trigonometry, oblique triangles, practical problems. Text, Rothrock's *Plane and Spherical Trigonometry*.

2.—COLLEGE ALGEBRA. Freshman year, winter term. Four hours. Four credits. Required in the courses in engineering, architecture, and general science.

Complex numbers, logarithms (theory and practice), undetermined coefficients, permutations and combinations, determinants, theory of equations, limits, and infinite series, are treated under this head. Text, *College Algebra*, by Rietz and Crathorne.

3.—ANALYTICAL GEOMETRY. Freshman year, spring term. Four hours. Four credits. Required in the courses in architecture and engineering; elective in the course in general science. Prerequisites: Plane Trigonometry and College Algebra.

This course treats of coordinate systems, projections, graphical representation, loci, straight line, conics, parametric equations, maxima and minima, empirical equations. Emphasis is placed upon graphical work. Text, *Brief Course in Analytic Geometry*, by Tanner and Allen.

4.—DIFFERENTIAL CALCULUS. Sophomore year, fall term. Four hours. Four credits. Required in the course in engineering; elective in the course in general science. Prerequisite: Analytical Geometry.

This course includes a study of fundamental principles, derivatives, differentials, maxima and minima, partial differentiation, applications to geometry and mechanics. Text, *Differential and Integral Calculus*, by Granville.

5.—INTEGRAL CALCULUS. Sophomore year, winter term. Four hours. Four credits. Required in the course in engineering; elective in the course in general science. Prerequisite: Differential Calculus.

The topics here treated are: fundamental formulas, integration of standard algebraic and transcendental expressions, definite integrals, applications to plane areas, to lengths, to surfaces, to volumes, and to problems of mechanics. Text, *Differential and Integral Calculus*, by Granville.

6.—MATHEMATICS OF BIOLOGY. Senior year, spring term. Four hours. Four credits. Elective in the course in general science. Prerequisite: Analytical Geometry.

Elements of differential and integral calculus, curve plotting, and determination of equations of curves, are here considered. This course is designed to meet the needs of students in biology and is taught largely by the lecture method.

Military Training

Second Lieutenant HILL, Professor of Military Science and Tactics.
Commissary Sergeant CLAEREN (U. S. A., retired), Assistant.
B. H. OZMENT, Band Leader.

Since this College is one of the beneficiaries of the act of Congress of 1862, military tactics is required in the College curriculum. All young men of the freshman and sophomore years are required to take military drill three full hours per week.

The course of instruction is concisely stated in General Orders No. 231, War Department, 1909, as follows:

"The main object of military instruction given at civil educational institutions having army officers as professors of military science and tactics will be to qualify students who enter the military departments of such institutions to be company officers of infantry, volunteers or militia."

In compliance with this general requirement, the course of instruction is divided into practical and theoretical work, arranged as follows:

a.—Practical:

Infantry drill, including school of the battalion.

Butts' Manual, with music.

Signal drill: International Morse code.

First-aid drill.

Minor tactics: advance and rear guard, outposts, patrolling, and marches.

Target practice.

Ceremonies: parade, guard mounting, review, inspection, funeral escort, and escort to the colors.

b.—Theoretical:

Company administration for cadet officers.

War Department manuals.

Lectures.

Students under military instruction are organized into a battalion of infantry, the organization, drill, and administration of which conform to that of the army.

Since the number of students assigned to military drill is sufficient to maintain a battalion organization, a band is also provided, the members

of which must be thoroughly trained in the drill of the school of the squad. Assignments to the band are made upon request of the band leader, who is charged with the technical instruction.

Officers and noncommissioned officers are selected by the professor of military science and tactics, with the approval of the President. This selection is made from among those cadets who have been the most studious and soldierlike in the performance of their duties, and the most exemplary in their general deportment. In general, the cadet captains and lieutenants are taken from the senior class, the sergeants from the junior class, and the corporals from the sophomore class.

The degree of excellence attained in military drill by the corps of cadets is limited wholly by the state of discipline existing in the corps. Therefore, military discipline, as far as compatible with College regulations, is rigidly enforced during the hour allotted to military work; and it is impressed further upon all cadets that their actions and behavior at times other than the hour for military drill should be regulated by the standards of honor and duty inculcated in military discipline. Each cadet is furnished with a copy of the Regulations for the Corps of Cadets, Kansas State Agricultural College, and will conform to the rules and requirements of the same.

All young men in College courses below the junior year, unless excused by reason of physical disability, are required to take military drill, and to complete the work of each term in a satisfactory manner. All requests for credit, for excuse on surgeon's certificate of permanent disability, or for postponement because of exceptional circumstances, are made to the President through the Commandant of Cadets, who thoroughly investigates each case on its merits and forwards the request, with his recommendations, for executive action. Additional work is optional with seniors and juniors, who are given preference for appointments as cadet officers and noncommissioned officers. A senior or junior having enrolled optionally, and having accepted a commission or warrant, is required to continue the work throughout the College year, subject to the same regulations as other cadets.

The uniform conforms to the West Point cadet pattern in all particulars. The cost of cap, blouse, and trousers is \$14.50. This expenditure actually represents an economy, as the young man receives an excellent, well-fitting suit, durable in texture and build, which gives him at all times a well-dressed appearance. The uniform must be purchased immediately after enrollment. New cadets, after being assigned to military drill, will report at once to the office of the Commandant of Cadets for measurement, and will then make their cash deposits to cover the cost of the uniform. The buying of old or of second-hand uniforms is absolutely prohibited, and they will not be accepted as satisfactory uniforms by the Commandant of Cadets.

At the close of the year the names of the cadets most distinguished in military science and tactics are reported to the War Department, and also to the adjutant-general of the State of Kansas.

To the cadets completing the full course in military science and tactics, many excellent opportunities are offered. These young men are well prepared to stand examinations for commissions in the regular service or in the Philippine constabulary, and their training at this institution makes of them efficient subalterns. In addition to such positions, opportunities exist for affiliation with the National Guard of the State. The War Department is in fact now preparing a plan whereby certain honorably mentioned graduates of institutions of this character may be commissioned in the National Guard.

Music

Professor VALLEY.
Assistant Professor BROWN.
Assistant BAUM.
Assistant FING.
Assistant BUDISON.
Assistant BEACH.
Band Leader OZMENT.

Recognizing the importance of music in our daily life, the power, cultural influence, inspiration, and pleasure it affords, and the necessity of musical knowledge for those who intend to enter the profession of teaching, this College offers to the earnest student a good opportunity for the study of music.

No regular or required course is given. The student may take music for one term only, or for an extended period of four years. Instruction is furnished free to all regular students assigned to music in the following branches: Voice, piano, violin, wind and brass instruments; notation, theory, harmony, and musical history.

CLASS INSTRUCTION. Class organization is wholly under the control of the professor of music, and classes are organized at such periods as best accommodate the students interested. There is a growing demand for teachers of music in high schools, and those taking advantage of the courses as offered will be well equipped to teach the subject.

COURSES IN MUSIC

VOCAL

Development and cultivation of the voice.

First Year.—The course for this year includes a study of breathing, tone placing, vocal physiology, simple forms of vocal technique, and the rendition of simple songs and ballads. Text, *Teacher's Exercises*. Concone's *Vocalises*, op. 9-17.

Second Year.—The study of vocal technique is extended. Concone's *Exercises* are continued. Sacred songs and ballads are studied.

Third and Fourth Years.—*Vocalises* by Bordese, Lamperti, Marchesi, Nava, Panseron, Rubini, and songs by Schubert, Brahms, Schumann, and other masters, as well as oratorio and operatic arias are studied during these years.

PIANO

First Year.—This course includes: studies in the rudiments of music, melody, rhythm, and the underlying principles of touch and technic; études by Gurlitt, Streabrog, Burgmuller, Kohler, Biehl, and simple selections from modern composers.

Second Year.—In this course are studied the compositions of Loeschhorn, Czerny, Heller, Lecouppey, Bertini, Duvernoy, and Smith. Preparatory octave studies, a study of scales, and special technical work are also offered.

Third Year.—Advanced work in technic and scales; studies by Cramer, Czerny, Field, Bach's little preludes and fugues, two-part inventions, Kullak octave studies, sonatas by Haydn and Mozart, selections from Chaminate, Rubinstein, Grieg, Scharwenka, Godard, Jensen, and Poldini, form the basic matter of this course.

Fourth Year.—Advanced work in technic, phrasing, and interpreta-

tion; Bach's three-part inventions and well-tempered clavichord, Clementi's *Gradus ad Parnassum*, Foete, MacDowell, and Henselt etudes, Beethoven sonatas, and more difficult selections from classic and modern composers, are studied during this year.

VIOLIN

First Year.—Particular attention is given to attaining correct position, intonation, and bowing. Methods by Hohmann, Wichtl, etudes by Wohlfahrt; scale studies; easy pieces, are considered in this course.

Second Year.—Methods by Wichtl, Dancla, etudes by Wohlfahrt, Kayser's Technical Studies; duets by Pleyel, Mazas, etc.; selections from Dancla, Singelee, DeBeriot, and modern composers, are the subjects of study during the second year.

Third Year.—Methods by DeBeriot, David; technical studies by Schradieck, special studies, Mazas scale studies; etudes by Kreutzer, selections from DeBeriot, Alard, and others; orchestral playing, comprise the work in this course.

Fourth Year.—Etudes by Kreutzer, Mazas's brilliant studies; scale studies; selections from Mozart, Tartini, Vieuxtemps, Wieniawski, and others; orchestral playing; ensemble classes, comprise the work of this advanced course.

ELECTIVE IN MUSIC

In connection with vocal and instrumental music the following subjects are required:

JUNIOR YEAR

Fall Term.—Theory, including notation of music, pitch, rhythm, measure, symbols, metronome marks, acoustics, chromatic signs, keys, major and minor scales, signatures; harmony, including intervals, triads of the major and minor scales; the history of music, including ancient and oriental music, and the progress of musical development to the close of the sixteenth century, are studied in this course.

Winter Term.—Theory, including intervals, chords, ear training, thinking tones, nonchordal tones, embellishments, and abbreviations used in music; harmony, including inversions of triads, dominant sept-chords and inversions; and history of music, treating music in the seventeenth century, opera, oratorio, and instrumental music to the present day, are studied during this term.

Spring Term.—Theory, including musical forms, vocal, instrumental, instrumentation and uses of various instruments, modern orchestra, prosody, musical terms in general use; harmony, including collateral sept-chords of the major and minor scales, inversions, cadences; and the history of music, including the biographies of great musicians—Bach, Haydn, Handel, Beethoven, Chopin, Schumann, Liszt, Wagner, Grieg, and others, are treated in this course. Texts: Theory, *Musical Essentials*, by Maryatt; Harmony, text by Brockhoven; History, text by Fillmore.

SENIOR YEAR

Fall Term.—Two lessons a week in vocal music or in specialized instrument are given. The work in harmony includes a study of chords of ninth, eleventh, etc., and altered chords.

Winter Term.—Two lessons a week in vocal music or in specialized instrument are given. The work in harmony includes a study of suspensions, analysis, and modulation.

Spring Term.—Two lessons a week in vocal music or in specialized instrument are given. The work in harmony includes a study of modulation, and harmonization of melodies.

MUSICAL ORGANIZATIONS. Each instrument has a distinct function in the science of tonal expression, and only in the combination of instruments are the finest effects in the coloring of the melody, harmony and

rhythm procured. This combination is made possible in the Department of Music by the number of students and by the variety of instruments. Students who are sufficiently advanced to join the College Choral Union, the College Glee Club, the College Orchestra, or the Military Band, may become members by assignment.

The Orchestra.—This organization endeavors to maintain a correct and well-balanced instrumentation, and gives the members opportunity for practical orchestral playing. The work is highly educational, including, as it does, the study and performance of standard overtures, symphonies, and concert pieces in classic and modern form. The orchestra furnishes music for the College Assembly each morning and assists in several concerts and entertainments during the year.

Choral Union.—Chorus singing is of great importance to students in voice, and this society was organized for their benefit. The students receive here much needed experience in sight reading, become familiar with choral masterpieces, and enjoy the broadening influence of these works. One rehearsal is held each week. Regular attendance is required.

Assembly Chorus.—The more advanced students are invited to sing in this chorus, which has for its object the rendition of a weekly choral selection at the assembly. Only the highest class of church music is used on these occasions. Rehearsals are held on Friday afternoons.

Glee Club.—The College Glee Club averages about sixteen of the best male voices in the institution.

Military Band.—The band is a part of the cadet corps, and practice in the band is accredited, through the Military Department, in lieu of drill and theoretical instruction. Members of the band are required to conform strictly to cadet regulations. Assignments to the band are made for the entire year by the leader. Members of the band are required to attend regularly until after Commencement exercises. The band furnishes music for all ceremonies of a military character and for various other college occasions.

Annual Concert.—On Wednesday of Commencement week, an annual concert is given by the Choral Union, assisted by the orchestra. In the spring term a number of musical recitals are given, of which the students furnish the entire programs. These recitals are open to the public.

Philosophy

Professor MCKEEVER.

The courses offered in the Department of Philosophy are intended to give the student practical assistance in the performance of his chosen work. With this end in view, the abstract speculations which once characterized many of the philosophic subjects are studiously avoided, while the concrete and human aspects of things are emphasized. In every course it is sought to have the student keep consciously in mind the human society in which he lives, and to set up for himself the goal of efficient membership therein.

The department is reasonably well equipped for doing satisfactory work. The psychology laboratory contains enough apparatus to meet the practical needs of the course, and the department library is sufficiently well stocked to admit of a liberal amount of reference work.

COURSES IN PHILOSOPHY

1.—PHILOSOPHY. Senior year, winter term. Class work, four hours. Four credits. Required in course in general science.

This is a lecture and recitation course in which the student is introduced to some of the more important and practical aspects of philosophy, such as (1) the special point of view of philosophy; (2) the philosophic implications of modern science; (3) man's destiny in the light of evolution; (4) the philosophy of work and of the vocational life. Brief consideration is given to defining the positions of some of the world's greatest philosophers. The student is required to do a liberal amount of reference reading and to offer a number of specially prepared discussions. The term's work is based on portions of Paulson's *Introduction to Philosophy*.

2.—PSYCHOLOGY. Junior or senior year, fall or spring term. Class work, four hours. Four credits. Required in the courses in home economics and general science.

This is a general course, combining lecture, recitation, and laboratory methods of instruction. An effort is made to master the general principles of the subject and to show the application of these principles to everyday life. The student is required to spend about one-half of the preparation time in reference reading, and to offer before the class during the term two or more independent discussions. It is also required that each student, by the use of laboratory instruments furnished by the department, make out a personal table of biometric measurements, a duplicate copy of which is kept on file. A short time is devoted to the study of some of the more important problems in social psychology. James's *Psychology* is used as a text, with the works of Angell and Judd as reference texts.

3.—INDUSTRIAL PSYCHOLOGY. Elective, fall term. Class work, four hours. Four credits. Elective in the courses in general science and home economics.

This course offers an opportunity to study some of the more special and practical problems of psychology, as, the psychology of advertising, of leadership, of the crowd, of mental therapy, of dreams (the Freudian theory), of the abnormal consciousness (psychiatry). Each student is required to make an extensive study of at least one such subject and to make a full report on it.

4.—ETHICS. Junior or senior year, winter term. Class work, four hours. Four credits. Elective in the courses in general science and home economics.

This is a lecture course giving brief consideration to systematic ethics and a fuller treatment of practical ethics. Theories of conscience and of the highest good are subjects of special consideration, as is also the psychological aspect of the development of the ethical judgment. Each member of the class is required to present a number of discussions of reference readings and to consider the application of ethics to his chosen vocation. Text, *Ethics of Progress*, by Dale.

5.—EUGENICS. Elective, spring term. Four hours a week. Class work. Four credits. Elective in the courses in general science and home economics.

Eugenics is a new and as yet unstandardized subject. The plan of treatment is about as follows: To consider man (1) from the point of view of biology and present-day theory of evolution; (2) in the light of present-day knowledge of animal breeding; (3) as so far revealed by the London Eugenics Laboratory, the American Eugenics Laboratory (at Cold Springs Harbor), and other such agencies; (4) as circumscribed by the traditional laws of the family, the statutes regulating marriage, and the like. The student is required to do a liberal amount of reading in this

new field and to give frequent reports on the subject matter. About one-half of the recitation hour is given to lectures.

6.—RESEARCH AND LABORATORY PSYCHOLOGY. Senior year. Eight hours a week. Four credits. An individual elective laboratory course, open to a very limited number of students.

Either one or two types of work may be attempted: (1) The pursuit of an inquiry into some carefully chosen social problem, with a view to securing new psychological data thereon; (2) the study of one or more laboratory problems, new to the student, with the use of the instruments for psychological measurements. In each case a full tabulated report of the work is required of the student.

Physical Education

Professor LOWMAN.
Instructor ENYART.
Instructor .
Assistant HOLLADAY.
Assistant .

The purpose of this department is to assist the students of the College to live to the best advantage, and so to aid them in the formation of hygienic habits that during their College course they may make profitable preparation for life. It is an urgent necessity that every student should have an intelligent appreciation of the means requisite for the preservation of his health, in order that he may be able to formulate intelligently his own policy of health control.

All young men and all young women of the College are entitled to the privileges of the gymnasium, which is one of the largest in the West and is well equipped with all sorts of apparatus for physical training, with lockers, plunge baths, shower baths, and other accommodations.

Physical Training is optional for men but may be elected. Three days a week for the term is considered full time and for this one hour of credit is given. A total of six hours of credit may be elected. All young women below the junior year are required to take physical training, unless excused by the Dean of Women, except that in the sophomore year music may be taken instead; provided that the student has a credit of at least one year of physical training. Women excused from physical training on account of physical disability are provided by their dean with an equivalent or stronger substitute from the regular course, and their normal work later in the course is increased by that amount. After the two years required physical training have been completed, women have the privilege of electing physical training for credit under the conditions stated above for the men.

The following phases of departmental work are combined for the purpose of accomplishing the desired end.

PHYSICAL TRAINING FOR MEN**PHYSICAL EXAMINATIONS**

The work of the department is based largely upon a physical examination given each student upon his first entrance to the College. A second examination is given at the close of his sophomore year. All students, whether taking work in the department or not, are entitled to receive a physical examination, and advice as to their physical condition.

The measurements taken and the tests given have each a definite purpose with reference to ascertaining the muscular condition of the individual. A diagnosis is also made of the vital organs to ascertain their functional condition, and a complete inspection of the whole body is made to detect any weakness or deformity that may exist. Based upon the information thus obtained, advice is given and work is assigned to students in accordance with their physical needs and tastes, and their condition of fitness. Delicate students, and those suffering from functional disorders, receive individual attention. Students organically sound are assigned work in a carefully graded and progressive system of gymnastics and athletics. All candidates for athletic teams, class as well as College teams, are required to enroll in the department, submit to a thorough physical examination, and pass the grade tests before being allowed to compete for positions on the various teams. Students engaging in two or more College sports during the school year must undergo a physical examination before undertaking any given sport. This is required in order that no student may indulge in athletics to his own permanent physical injury. Each student may secure a copy of his own physical measurements, and an anthropometric chart, showing in graphic form his own development as compared with the average or typical man.

Members of the College teams, reporting regularly, are excused from regular class work, and are entitled to full credit in that portion of their work; but before the completion of the course, at least two terms' work must be done in the gymnasium. Credit, the equivalent of a one-hour subject, is given and counts toward promotion and the College degree. The individual's grade rests largely on the basis of attendance, punctuality, earnestness, and application; but written and practical tests are also given.

Regulation uniforms must be worn in the gymnasium. Students are advised not to procure uniforms until after their arrival at the College.

HYGIENIC INSTRUCTION

This instruction gives an insight into the practical problems of daily healthful living from a personal point of view. Directions are given for avoiding the common ills of student life, and for maintaining the highest physical and mental condition while in college, as well as for gaining the highest development of vital power and health for future duties.

1.—**FRESHMAN COURSE.** Sixteen lectures. These lectures give special attention to exercise, rest, food, respiration, care of excretions, clothing, and bathing and cleanliness. The effects of certain abnormal bodily conditions and habits are also given due consideration, *e.g.*, adenoids, large

tonsils, decayed teeth, mouth breathing, rapid eating, the use of narcotics and stimulants, constipation, and certain phases of social hygiene. Training principles for athletic contests and athletic equipment also receive attention.

2.—SOPHOMORE COURSE. Twelve lectures. This course reviews and enlarges upon certain phases of the subfreshman course; deals with bacteria and a few other common causes of disease, their distribution and transmission; includes a discussion of the "common carriers" of disease, such as food, water, clothing, flies, mosquitoes, other insects, animals, and careless human beings; discusses the defenses against disease, such as established boards of health and quarantine, and appropriate sanitary legislation. The defenses of the individual, such as cleanliness, avoidance of the carriers of disease, the use of antiseptics, sunshine, fresh air, and immunity are further discussed.

INSTRUCTION IN PHYSICAL EXERCISE

This course furnishes instruction in all the various grades of gymnastic and athletic exercises offered by the department. The great variety of exercises offered is intended to meet all individual needs, capacities and tastes. A physical examination and test determines the grade or class of exercises for which a student is fitted.

A.—GYMNASICS. During the winter term the work is conducted indoors, and consists of light and heavy gymnastics, which are selected with a view to obtaining progressive effect upon the bodily organism:

a. Free Calisthenics. Exercises are selected for their different effects upon the bodily organism, and are arranged in the order of increasing difficulty. They involve hygienic or body-building work, educative movements, and corrective or remedial exercises. Both the Swedish and the German systems are used.

b. Tactics. A modified form of the military and of the German system is used, both for convenience in handling classes and for disciplinary value.

c. Light Apparatus. Training is given in the use of Indian clubs, dumb-bells, wands, bar bells, etc.

d. Heavy Apparatus. Graded exercises are given on parallel bars, vaulting bars, bounce board and mat, side and long horse, high and low horizontal bars, traveling and flying rings, etc.

e. Indoor Athletics. Instruction is given in all indoor track events preparatory to indoor track meets.

f. Games. There are included basket ball, indoor baseball, volley ball; also, other games of a more recreative nature.

g. Specials. Under this head come fencing, boxing, wrestling, tumbling, and advanced apparatus work, offered as advanced work to those who have had not less than two terms' work in the gymnasium. Hours are arranged with the instructor.

h. Swimming. A part of the regular instruction for the spring term is swimming. A passing grade must be made in this phase of the work.

B.—DEPARTMENTAL ATHLETICS. In the fall and spring terms, the courses in the gymnasium are partly supplemented by instruction in outdoor athletics. Individuals are assigned to the kind of work best suited to them. Attendance is compulsory upon those participating. In the fall the following sports are offered: football; track and field events; cross-country running; and outdoor basket ball. In the spring are offered: baseball; track and field events; cross-country running; and outdoor basket ball.

Cross-country running is encouraged throughout the year. Natural

exercise in the open air takes precedence of all other forms of exercise. Opportunity is offered for tennis, but it can not be elected in place of required work.

Days unsuited for outdoor work are devoted to a discussion of playing rules, the principles of training for athletic contests, and lectures on team work.

C.—INTERCOLLEGiate ATHLETICS. These contests are promoted and encouraged for the more vigorous students, because of their effect upon college life, and their wide social and moral value to the participants. Intercollegiate teams should represent the final stage of selection in an educational process and development among a large number of students, thereby giving both a rational physical education system and a healthy system of sport. Intercollegiate contests are scheduled for the different sports, viz., football, basket ball, baseball, track athletics, and tennis.

PHYSICAL TRAINING FOR WOMEN

PHYSICAL EXAMINATIONS

A physical examination of each young woman is made by the instructor in charge of women before permission to enter a class is given. This includes an elaborate system of body measurements and an examination of the condition of the heart and lungs. Physical defects, abnormalities, and weaknesses are noted and judicious healthful exercise is prescribed to fit the student's individual needs.

A suit has been adopted which consists of black serge blouse and bloomers, and must be made in uniform style. The pattern for the suit is the *Ladies' Home Journal* pattern number 5421.

INSTRUCTION IN PHYSICAL EXERCISE.

1.—PHYSICAL TRAINING I. Freshman year, each term. Four hours. Required of all young women.

Health talks are given. Correction of improper standing and walking, marching, free exercises, folk dancing, elementary series in wands, dumb-bells, Indian clubs, balance ladder, song plays, and games are treated in this course.

2.—PHYSICAL TRAINING II. Freshman year, each term. Four hours. Required of all young women. Prerequisite: Physical Training I.

In this course military marching, fancy steps, continuation of work with light apparatus, stall bars, flying rings, giant stride, chest weights, games and basket ball are included.

3.—PHYSICAL TRAINING III. Freshman and sophomore years, each term. Four hours. One term required of all young women; three subsequent terms, optional with music, required of all sophomore young women.

Fancy marching, aesthetic dancing, advanced free exercises, coördination work with Indian clubs, wands, and dumb-bells, jumping horse and parallel bars are here included, along with folk dances and song plays, tennis, and indoor baseball. Prerequisite: Physical Training II.

Physics

Professor HAMILTON.
Instructor JENNESS.
Instructor FLOYD.
Assistant RABURN.
Assistant BLATTNER.
Assistant ALLEE.

Recognizing the need of a thorough knowledge of the fundamental laws and principles involved in all physical changes, provision has been made, in the courses which follow, for both a theoretical and a practical treatment of the subject. Instruction is based upon the facts given in selected textbooks, and these topics are enlarged upon by lectures and illustrated by experimental demonstrations. The purpose is to give a training in exact reasoning, and a knowledge of principles that will be factors in the solution of problems in all branches of science as well as in everyday life.

The laboratory work which accompanies the courses in physics gives a student abundant opportunity to test the principal laws of the science; and, since he is expected to arrange and operate the apparatus, the work should enable him to acquire skill in manipulation, precision of judgment, and care in the use of delicate instruments. The laboratories are well arranged for the work, and the equipment provided is of a nature adapted to meet the requirement of accurate work in all courses. The manual in use in most of the courses is one prepared by the department to meet the exact conditions and equipment of the laboratory.

COURSES IN PHYSICS

1.—**HOUSEHOLD PHYSICS.** Fall, winter, and spring terms. Class work, four hours. Four credits.

A course of lectures and demonstrations, in which the laws relating to principles involved in appliances of the household are explained and illustrated. The work in heat is based upon thermometry, calorimetry, radiation, absorption, and methods of refrigeration and ventilation. The course includes a study of light, with its color phenomena and actinic effects; of some of the optical instruments used in scientific work; a study of electric lighting and illumination, and of the cost of operating many of the appliances used in the home, including suggestions for the proper use and care of electrical apparatus for the protection of the appliance and of the operator.

2.—**GENERAL PHYSICS I.** Fall term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: Plane Trigonometry.

This course, like the one following, is provided for those intending to specialize in scientific lines. It covers, in as thorough a manner as possible, the general principles involved in mechanics and sound. Text, Reed and Guthe's *College Physics*.

Laboratory.—The work is based upon laws and principles discussed in the classroom, and is so arranged that the students may have a practical illustration of the facts learned.

3.—**GENERAL PHYSICS II.** Winter term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: General Physics I.

This course includes a study of the theory of electricity. The class follows the subject as outlined in the text, but special emphasis is placed

upon those parts that have an immediate bearing on the work of other sciences, such as electrolysis, thermal effects, relation of electrical and mechanical energy. Text, Reed and Guthe's *College Physics*.

Laboratory.—The work follows the subjects presented in the class, and is conducted with a grade of apparatus that gives training in the use of the better class of instruments employed in scientific investigations.

4.—GENERAL PHYSICS III. Spring term. Class work, three hours; laboratory, two hours. Four credits. Prerequisite: General Physics II.

The work offered in this course includes the theory of heat and light. A study of the various effects of heat and the units employed in heat measurements. The work in light discusses not only the effects of light, but the methods used in measuring light intensities and the ways in which light may be used in physical measurements. Text. Reed and Guthe's *College Physics*.

Laboratory.—The laboratory work consists of measurements in calorimetry, photometry, spectrum analysis, and light waves.

5.—ENGINEERING PHYSICS I. Fall and winter terms. Class work, four hours; laboratory, two hours. Five credits. Prerequisite: Trigonometry.

This course in mechanics is intended to give the engineering students as thorough a working knowledge as possible of the fundamental units and laws involved in force, work, power, and energy; also the laws of simple machines, gases and liquids as they occur in the transformation of force and energy. Text, Spinney's *A Textbook of Physics*.

Laboratory.—The work consists of the use of apparatus to test the laws of inertia, moments of force, moments of torsion, elasticity, and rigidity, and other laws and principles involved in mechanics. Accurate measurements and carefully recorded data are required.

6.—ENGINEERING PHYSICS II. Winter and spring terms. Class work, four hours; laboratory, two hours. Five credits. Prerequisite: Engineering Physics I.

This course treats of electricity and light. The work in electricity is of such a nature as to give the student a working knowledge of the units employed, and of the fundamental laws; and to acquaint him with methods of producing a current, its uses, and the system by which electrical energy is measured. The principal phenomena of light, together with the laws that may have a direct bearing upon light as a standard and method of measurement, are treated in this course. Text, Spinney's *A Textbook of Physics*.

Laboratory.—The electrical work in this course includes measurements of resistances, a study of primary cells, and the transformation of mechanical into electrical energy. The work of light consists of a study of the laws of reflection and refraction, and measurements of wave lengths by means of the spectroscope, the use of the interferometer, and photometry.

7.—ENGINEERING PHYSICS III. Fall and spring terms. Class work, four hours; laboratory, four hours. Six credits. Prerequisite: Engineering Physics II.

Heat is treated both theoretically and practically, and in such a manner that its relation to mechanical energy is emphasized. The methods of measuring heat energy and the methods of heat transformations and transference are discussed and illustrated. The facts in sound that involve points of special use and training are discussed. Text, Spinney's *A Textbook of Physics*.

Laboratory.—This course consists of measurements of velocity of sound in solids and gases, thermometry, calorimetry, expansion of solids, liquids, and gases, and the mechanical equivalent of heat.

8.—AGRICULTURAL PHYSICS. Spring term. Class work, four hours. Four credits.

This course includes a series of lectures and class demonstrations based upon heat, light and electricity as involved in influencing farm life. The elementary factors of weather and weather forecasting are explained, and access given to the weather records and apparatus of the College weather station. The work in light emphasizes the value of light in plant growth, in spectrum analysis, and in many of the natural phenomena. Electricity is presented in such a manner that the student may gain a working knowledge of the various electrical appliances that can be used on the farm.

9.—ACOUSTICS. Fall term. Class work, two hours. Two credits.

In this course a special study is made of the acoustic properties of buildings, of the architectural defects which give rise to poor acoustics, with a study of special methods used to avoid such troubles in construction of buildings or to correct them in constructed buildings.

10.—RADIANT ENERGY. Fall term. Class work, three hours; laboratory, two hours. Four credits. Elective.

This course and the two courses following are arranged with the special purpose of giving a sort of training which will be of value to those who may intend to teach physics, chemistry, or mathematics, or to those expecting to do advanced scientific work. The various forms of radiant energy are discussed; spectra and spectrum analysis, polarized light, radioactivity, electric and magnetic waves, absorption and dispersion and their phenomena.

Laboratory.—The work is based upon the theory as developed in the class work, and includes the use of the spectrometer, polariscope, interferometer, optical bench, of photometry, etc.

11.—PHYSICAL MEASUREMENTS. Winter term. Class work, two hours; laboratory, four hours. Four credits. Elective.

The class work is based upon principles that are involved in instruments for accurate measurements. The instruments described and used are typical ones employed in measurements of mechanical forces, heat, and electricity. Part of the class work is the development of formulas.

Laboratory.—The work is so selected as to give the widest possible range in the variety of instruments used and of principles illustrated.

12.—PHYSICAL MANIPULATIONS. Spring term. Class work, two hours; laboratory, four hours. Four credits. Elective.

Class periods are utilized for outlining and discussing the selection and arrangement of apparatus for demonstrational work.

Laboratory.—The work consists of glass blowing, bending and grinding; silvering, photography, electroplating, and the making of pieces of apparatus for special demonstrations. In this course opportunity is given those intending to teach to become thoroughly acquainted with modern laboratories and laboratory methods.

13.—PHOTOGRAPHY. Fall or spring term. Class work, two hours; laboratory, two hours. Three credits. Elective. Prerequisites: Physics and Chemistry.

The importance of a record of exact details, as shown in a photograph, makes this work valuable to all scientists. The course gives the student some knowledge of the chemical and physical principles involved in the art, as well as practice in making good negatives and prints. The lecture and laboratory work deals with things to be considered in selecting a camera; proper exposures; composition of pictures; proper development of plates; tests of different developers; retouching; reducing and intensifying negatives; printing and mounting; making lantern slides, bromide enlargement, and the prints best adapted for illustrated articles in newspapers and magazines.

Public Speaking

Assistant Professor JOHNSTON.
Assistant _____.

It is the constant effort of this department to correlate the training in public speaking with the work in all the other departments of the College; to harmonize it with the spirit of the school, which is distinctly technical and industrial in character. With this end in view, students in agriculture are trained in the presentation and discussion of agricultural facts before supposed audiences of farmers. Students in engineering, home economics, architecture, etc., are trained in speaking on subject matter relating to their respective courses of study, and to their probable needs and activities in later life. Conviction, not entertainment, is the dominant purpose in every case.

COURSES IN PUBLIC SPEAKING

1.—PUBLIC SPEAKING. Freshman year, fall, winter, or spring term. Four hours a week. Four credits. Required in the courses in general science and industrial journalism.

This course begins with a study of the fundamental principles and accepted rules of public address. These are applied in the interpretation of selected masterpieces of general literature and oratory, and also in the delivery of original subject matter by each student, the class serving as his audience and critics. Some time is devoted to exercises in correct breathing, articulation, and tone production, and to fit these to the individual needs of students. Instruction is given by recitation, lectures, and platform work. Text, Kammeyer's *Principles and Practice of Public Speaking*.

2.—EXTEMPORE SPEECH. Freshman year, spring and fall terms. Two hours a week. Two credits. Required in the courses in the Division of Mechanic Arts.

This course is an abbreviation of Public Speaking and is limited to students in the Division of Mechanic Arts. It is not an equivalent of Public Speaking and may not be substituted for it. Instruction is given by means of lectures and platform work.

3.—TECHNIQUE OF SPEECH. Junior or senior year, winter term. Two hours a week. Two credits. Elective in the course in general science. Prerequisite: Public Speaking or Extempore Speech.

The specific purpose of this course is to offer more extended drill and practice in vocal and physical expression than can be given in the others as outlined. Practically all the time is devoted to exercises for the correction of faulty articulation, grouping, bearing, attitude, gesture, etc. Reading and impromptu speaking before the class afford opportunity for testing the ability acquired. The dominant purpose of the course is to help students to fix correct habits of speech by means of frequent repetitions and conscious effort. Instruction is given by means of drill and platform work.

4.—FORMS OF PUBLIC ADDRESS. Junior or senior year, spring term. Four hours per week. Four credits. Elective in the course in general science. Prerequisite: Public Speaking or Extempore Speech.

A special study of types of utterance and forms of public address is made. Great orations of ancient and modern times are studied in their historical settings, analyzed, and interpreted. Original platform work

continues throughout the term, and consists of after-dinner speeches, memorial addresses, debates, and other forms of public address for formal occasions. Instruction by assigned readings, lectures, and platform work.

Rural and Vocational Education

Professor HOLTON.
Professor MCKEEVER.
Professor VAN ZILE.

The teaching of rural and vocational education has been organized to fulfill the requirements of the State Board of Education for the granting of a state teacher's certificate by accredited colleges.

Any student completing any one of the courses leading to the degree of bachelor of science will be granted a state certificate to teach in any of the schools of Kansas, provided he has made satisfactory grades in general psychology and in the following courses in education:

COURSES IN RURAL AND VOCATIONAL EDUCATION

1.—EDUCATIONAL PSYCHOLOGY. Junior or senior year, fall, winter, and spring terms. Class work, four hours. Four credits. Required for state teacher's certificate.

The subject matter of the course is the general principles of psychology as applied to fundamental educative processes. The psychology of habit formation and of work is emphasized; special attention is given to the psychology of vocational subjects.

2.—HISTORY OF EDUCATION. Junior or senior year, fall, winter, and spring terms. Class work, five hours. Five credits. Required for state teacher's certificate.

The course includes: education in primitive society; types of education; Oriental, Chinese and Persian education; Greek education, and the development of individualism; the utility idea in Roman education; education during the Middle Ages; the Renaissance, the Reformation, and the educational ideals of Rousseau, Pestalozzi, Froebel, Herbart, and Spencer; the evolution of the public school, the high school, the industrial school, and the college.

3.—PRINCIPLES OF EDUCATION. Junior or senior year, fall, winter, and spring terms. Class work, four hours. Four credits. Required for state teacher's certificate.

The course comprises a study of the controlling purposes of the educational ideals, with special emphasis placed upon the biological, sociological and vocational ideals; practical problems of the curriculum and methods of instruction.

4.—SCHOOL HYGIENE. Junior or senior year, fall, winter, or spring term. Class work, two hours. Two credits. Required for state teacher's certificate.

The course includes a study of the school plant and equipment from the viewpoint of the mental and physical hygiene of the child; the standard tests for revealing the mental and physical defects of school children; the Simon-Binet test for mental measurements; school diseases and preventive measures.

5.—SCHOOL ADMINISTRATION. Junior or senior year, fall, winter, and spring terms. Class work, four hours. Four credits. Required for state teacher's certificate.

This course is a study of the organization of state, city and county school systems, with special emphasis upon the rural and vocational schools; the interrelation of boards of education, superintendent, principal, and teachers. The school law of Kansas is also studied.

6.—OBSERVATION AND TECHNIQUE OF TEACHING. Senior year, fall, winter, and spring terms. Two hours. One credit. Required for state teacher's certificate.

The actual teaching by regular teachers in the School of Agriculture is observed; a study is made of the methods of presentation and of the technique of teaching, with special emphasis upon the vocational subjects.

7.—PRACTICE TEACHING. Senior year, fall, winter, and spring terms. Two hours. One credit. Required for state teacher's certificate.

Each candidate for a teacher's certificate is required to teach one hour a week for one term in the School of Agriculture; preparation and presentation of the subject matter of the curriculum are discussed.

8.—AGRICULTURAL EDUCATION. Senior year, fall, winter, and spring terms. Class work, two hours. Two credits. Required of all candidates for state teacher's certificate who are preparing to teach agriculture.

This course is a study of typical secondary schools of agriculture and departments of agriculture in public schools; of land-grant colleges; of the making of a course of study in agriculture for elementary and secondary schools; of laboratory supplies and equipment; of the pedagogy of vocational subjects.

9.—INDUSTRIAL EDUCATION. Senior year, fall, winter, and spring terms. Class work, two hours. Two credits. Required of all candidates for state teacher's certificate who are preparing to teach manual training, shop work, trade courses, and other industrial subjects.

This course is a study of typical secondary schools of industrial education and departments of industrial education in public schools; of the industrial schools of Germany; of the making of a course of study in industrial education for elementary and secondary schools; of shop equipment and cost; of the pedagogy of vocational subjects.

10.—HOME ECONOMICS EDUCATION. Senior year, fall, winter, and spring terms. Class work, two hours. Two credits. Required of all candidates for state teacher's certificate who are preparing to teach home economics.

This course is a study of typical secondary schools of home economics and departments of home economics in public schools; of the making of a course of study in home economics for elementary and secondary schools; of laboratory equipment and its cost; of the pedagogy of vocational subjects.

11.—RURAL EDUCATION. Junior and senior year, fall, winter, and spring terms. Class work, four hours. Four credits. Elective.

This is a course on the subject matter and methods employed in rural and agricultural education. An outline syllabus of the course is as follows: The development of agricultural education; agricultural colleges; écoles pratiques d'agriculture in France; Folkehojskoler in Denmark; agricultural schools in Wisconsin, Massachusetts, and other states; school gardens; organization of the course of study for rural high schools; extension service; rural schools and community service; district, township and county as units of school organization; consolidation of rural schools.

12.—PRACTICUM IN RURAL EDUCATION. Senior or graduate students, fall, winter, and spring terms. One double period a week. The number of credits (not to exceed two for each term) depends upon the time given to investigation and the quality of the work. Elective.

This course consists of research in rural education.

13.—PRACTICUM IN VOCATIONAL EDUCATION. Senior or graduate students, fall, winter, and spring terms. One double period a week. The number of credits (not to exceed two for each term) depends upon the time given to investigation and the quality of the work. Elective.

This course consists of research in vocational education.

Sociology

Professor HOLTON.

It is recognized by all students of the development of civilization that a knowledge of the fundamental laws controlling social groups is essential in the education of those who will largely determine the character of our rural institutions. The controlling motives in the courses in sociology are: (1) the need of social efficiency in our rural institutions, and (2) the farmer's demand for a national agrarian policy.

COURSES IN SOCIOLOGY

1.—SOCIOLOGY. Senior year, fall, winter, and spring terms. Class work, four hours. Four credits. Required in the courses in agriculture and industrial journalism; elective in other courses.

This is a course in the elements of sociology. An outline syllabus of the course is as follows: Primary aspects of social organizations, and the social and industrial mind; the nature of social organizations; the democratic mind; public opinion as an organizing factor; democracy as a training in self-control; commercialism; democracy and Christianity; special classes; the caste principle; race caste; medieval caste; equal opportunity and social efficiency; economic betterment and ill-paid classes; labor organizations; poverty; the nature of social institutions; the family; the church; the economic system; public education; the function of the public will; municipal socialism; the growing efficiency of government.

2.—RURAL SOCIOLOGY. Senior year, winter and spring terms. Class work, four hours. Four credits. Optional in the course in agriculture; elective in other courses.

This is a course in the elements of sociology applied to rural traditions, customs and institutions. An outline of the course is as follows: Old World peasantry; the making of peasantry; prevention; the trend of rural population; the composition of rural population; rural social institutions; the rural church; the rural school; farmers' organizations; vital statistics; moral level; delinquency and dependence; insanity; the position and work of women; farm labor; rural politics; cultural ideals; standards of business; the psychology of rural life; class consciousness.

3.—COMMUNITY SURVEYS. Senior and graduate students, fall, winter, and spring terms. One double period a week. The number of credits (not to exceed two for each term) depends upon the time given to investigation and the quality of the work. Elective.

This course is a study of the methods of investigation and plans of work employed by social-service institutions, such as endowed foundations and bureaus of municipal research. Each student works out plans for, and makes a survey of, the health, social, economic and educational conditions in a given community.

Zoology

Assistant Professor NABOURS, in charge.
Assistant Professor SCOTT.
Instructor HARMAN.
Instructor _____.

Classroom teaching and laboratory instruction are closely correlated, and the student is expected to be able to draw conclusions based upon a comparison of information from both sources. As nearly as circumstances permit, the classroom and laboratory work on the same form proceed simultaneously. By means of frequent and carefully planned excursions and the free use of vivaria in the laboratory and museum, the student is never allowed to forget that he is dealing with living creatures, in many cases fellow members of his own environment, some of which are decidedly beneficial or decidedly injurious to his welfare. The courses offered by this department are intended to awaken in the student an appreciation of the general principles of animal life and of its relation to the welfare of man.

A large number of standard anatomical charts, and representative collections of vertebrates and invertebrates, a series of lantern slides, and a series of microscope mounts are available for illustrative purposes. Compound and dissecting microscopes sufficient for the needs of laboratory classes have been provided.

COURSES IN ZOOLOGY

1 to 3.—GENERAL ZOOLOGY I, II, AND EMBRYOLOGY. Sophomore year for students in agriculture and home economics. Freshman year for students in general science, industrial journalism, and veterinary medicine. Required of all students in these courses. Fall, winter and spring, or winter, spring and fall terms, respectively. Class work, two hours; laboratory, four hours. Four credits each term. Men and women are taught in separate sections. The students are grouped in sections according to the amount of their experience, and the nature of the work is varied to suit the needs of each group.

Course 1 represents a connected elementary study of the structure and functions of types selected to illustrate the development of the invertebrate part of the animal kingdom. Attention is given to classification and the relations of the different forms.

Course 2 consists of a connected elementary study of the structure and functions of types selected to illustrate the development and relations of the vertebrate part of the animal kingdom. Some attention is given to classification, but the work mainly consists of a study of the organs and their functions of a few selected types.

Course 3 (Embryology) represents a study of the development of the germ cells, fertilization, and the nutrition and growth of the vertebrate embryo, with a greater emphasis on the comparative study of the development and nutrition of the foetuses of the domestic mammals and man. This course aims to give a general idea of embryological development and a better understanding of the organs and their functions of the types in the phylum Chordata.

Laboratory.—The laboratory work in courses 1 and 2 consists of observations of the form and activities of living animals, both in the field and in the vivaria in the laboratory and museum, and of the dissection and sketching of the important systems of those animals selected as types.

The laboratory work in embryology represents a microscopic study of the male and female germ cells, stages in the process of fertilization, the segmenting ovum, and the serial sections and whole mounts of the chick and pig embryos in several stages of development. Considerable attention is given to the dissection and study of the relations of the foetus to the uterus of the mother in the cat, pig, cow, and man.

4 to 6. ADVANCED ZOOLOGY I, II, and III. Junior or senior year, fall, winter, and spring terms, respectively. Class work, two hours; laboratory, four hours. Four credits each term. Elective in the courses of general science, agriculture, and home economics. Prerequisites: General Zoölogy I, II, and Embryology, or equivalent.

Course 4 represents a fundamental study of the structure and functions of invertebrate types. Course 5 begins the same sort of study of chordate types. Relationships are considered from the point of view of embryology and paleontology, as well as that of comparative anatomy. Course 6 is a continuation of the preceding.

Laboratory.—The laboratory work consists of the dissection and sketching of the systems of selected types and of such experiments in fundamental physiology as the time and apparatus permit.

7.—ADVANCED MAMMALIAN EMBRYOLOGY. Senior year, winter term. Elective in the courses in general science and agriculture. Prerequisite: General Zoölogy I, II, and Embryology, or equivalent. Lecture and class work, three hours. Three credits.

This course consists of a review and further study of the main facts of embryology, with a more particular comparative study of the physiology of reproduction in the domesticated mammals and man.

8.—GENERAL ZOOLOGY TECHNIQUE. Junior or senior year, spring term. One lecture and six hours of laboratory a week. Four credits. Elective in the courses of general science, agriculture, and home economics.

This course is designed especially for those expecting to continue work along biological lines. The students become acquainted with methods of collecting, killing, and preserving, and with the preparation for study of various sorts of zoölogical material, both gross and microscopic. It includes the making of whole mounts and the general methods of imbedding, sectioning and staining microscopic material for microscopic slides. The lectures explain further the theory and practice of useful methods of technique. Prerequisites: Zoölogy I and II.

9.—PARASITOLOGY. Senior year, winter term. Class work, two hours; laboratory, two hours. Three credits. Required in the course in veterinary medicine; elective in the courses in general science, agriculture, and home economics. Prerequisites: General Zoölogy I and II, or the equivalent.

This course includes a study of the chief characteristics, life histories, economic importance of the serious external and internal parasites of domestic animals and man.

Laboratory.—The laboratory work is a study of the structural and functional adaptations characteristic of a parasitic existence.

10.—EVOLUTION OF DOMESTIC ANIMALS. Senior year, winter term. Class work, two hours. One credit. Elective in the courses in general science, agriculture, and domestic science.

This course consists of lectures and readings on general evolution, with special reference to the domestic animals. The geological history, so far as it is known, and some phases in the domestication of our common farm animals are given careful attention. Each student works out very completely the geological and later history of some specially assigned animal.

11.—ECONOMIC ZOOLOGY. Spring term, sophomore, junior, or senior year. Lectures, two hours; laboratory, four hours. Four credits. Elective in the courses in home economics, agriculture, and general science.

This course consists of a study of the different phyla of animals and their dependence on one another, and special studies of birds and mammals. The publications of the experiment stations and Department of Agriculture and the specimens in the museum are used extensively, both in the class and in connection with the field work.

Laboratory.—The laboratory work consists largely of four-hour field trips to a number of specially selected areas, ponds, streams, meadow, woods, and college farm. Much of the time of the trips is taken in the identification of birds and mammals, with special attention given to their adaptation and economic importance.

12.—ZOOLOGICAL SEMINAR. For the staffs in entomology and zoology and advanced students in these departments. Noncredit. One two-hour session a week. Fall, winter, and spring terms, respectively.

This course consists of the presentation of papers on original investigations by members of the two departments and advanced students. Here the papers to be read at scientific meetings or published in scientific journals or bulletins are discussed. Most of the sessions are devoted to the presentation and criticism of the best thoughts on the fundamental problems of biology found in the books and periodicals in the library or reported by members from scientific meetings.

Special Courses for Teachers

At the present time the teaching of vocational subjects in the public schools is undergoing great development. Many schools are introducing manual training, agriculture, domestic science, and domestic art, and many others are extending the work hitherto given. The State law requiring the teaching of agriculture in the rural schools is also proving to be a strong movement in the same direction. There is an active demand for teachers who can handle such work successfully.

The College offers to graduates of other institutions, and indeed to all who have studied such subjects as may be prerequisite, unexcelled facilities for securing training in the industrial subjects indicated. Courses extending over one or two years may be arranged by means of which the student who is already prepared in English, mathematics, and to a certain extent in the sciences, may prepare himself to enter a broader and, frequently, a more remunerative field.

Pages 201 and 203, Nos. 16, 16, 17, 19, 20, and 21, exhibit groupings that illustrate the possibilities in work of this character, and other arrangements may be made. Those taking such courses will be cared for in the regular classes provided for other students, and no limitation is imposed except that the prerequisites for any subject must have been taken previously, here or elsewhere. These prerequisites are stated in this catalogue in connection with the description of each subject. The catalogue also shows the terms in which a subject is regularly given, but many of those of the freshman and of the sophomore year are also offered at other times. Prospective students may receive information concerning such other opportunities by addressing the President of the College.

The Summer School

EDWIN L. HOLTON, Director.

There is no larger or better equipped plant devoted to the teaching of agriculture, home economics, mechanic arts and related subjects than Kansas has in her State Agricultural College. In order that this plant may not remain idle during the summer, the Board of Administration has authorized the organization of a Summer School for Teachers. The College is authorized by an act of Congress to expend each year a portion of the national appropriation for "providing sources for the special preparation of instructors for teaching the elements of agriculture and mechanic arts."

Each year there is an increasing demand for trained teachers of agriculture, shop work, and home economics. The College has not been able to supply this demand. The Summer School offers an opportunity for experienced teachers to prepare themselves to meet the new demands placed upon the public schools, viz.: preparing the boys and girls for vocational and social efficiency.

ADVANTAGES AT THE KANSAS STATE AGRICULTURAL COLLEGE

For the training of teachers in vocational subjects the Kansas State Agricultural College has a peculiar advantage. The College campus occupies a commanding and attractive site upon an elevation adjoining the western limits of the city of Manhattan, with electric car service into town and to the railway stations. The grounds are tastefully laid out according to the designs of a landscape architect, and are extensively planted with a great variety of beautiful and interesting trees, arranged in picturesque groups, masses and border plantings, varied by banks of shrubbery and interspersed with extensive lawns, gardens and experimental fields. Broad, macadamized and well-shaded avenues lead to all parts of the campus. Including the campus of 160 acres, the College owns 748 acres of land. Outside the campus proper, all the land is devoted to practical and experimental work in agriculture. Within the College grounds most of the space not occupied by buildings or needed for drives and ornamental planting is devoted to orchards, forest and fruit nurseries, vineyards, and gardens.

The College buildings, twenty-one in number, are harmoniously grouped, and are uniformly constructed of attractive white limestone obtained from the College quarries. The Col-

lege owns and operates its own system of waterworks, and is provided with a complete sewerage system.

There is a growing conviction among the leading educators that the best institution in which to train teachers of vocational subjects is a well-equipped technical college, where the courses of study are pointed towards the producing vocations. The Kansas State Agricultural College is such an institution.

EXPENSES

Tuition is free. An incidental fee of \$3 and a medical fee of 50 cents per term are charged all students whose homes are in Kansas. For nonresidents of the state a matriculation fee of \$10 upon entrance and an incidental fee of \$10 and a medical fee of 50 cents per term are charged. Receipts for these fees must be presented before enrollment in the College classes. Table board varies from \$3.50 to \$4 per week. Room rent ranges from \$8 to \$12 per month. The College Young Men's Christian Association offers accommodation in its building for a limited number of students, at prices from \$10 to \$12 per month. The cost of rooms is reduced by half where two students room together.

COLLEGE CREDITS

Full College credit is given for all courses satisfactorily completed by regularly matriculated students unless otherwise specified in the announcement of the courses. Students desiring College credit are not allowed to carry more than ten credit hours; provided, that an exceptionally strong student may be permitted to carry two additional credit hours upon the approval of the Director of the Summer School.

REQUIREMENTS FOR ADMISSION

Four years of high-school work are required for admission to the College, but any applicant holding a teacher's certificate will be admitted to the courses for the Summer School without examination.

The following classes of applicants will be admitted:

1. Students already enrolled in the College.
2. Graduates of high schools that have four-year courses of study.
3. Any one holding certificate to teach in the state of Kansas.
4. Prospective teachers who are not graduates of four-year high schools and who do not hold teacher's certificates may be admitted as special students.

CONVOCATION

The hours from ten to eleven on Thursdays are reserved for general assembly of all students. A special address and music are arranged for each of these general assembly periods.

LIBRARY

The library is open during the summer. The librarian places all the valuable books, bulletins and reports at the service of the Summer School students.

EDUCATIONAL TRIPS

Trips are arranged for those who desire to take them, to the experimental grounds on the College farm and campus, to study the work in progress. These trips are under the leadership of trained men.

RURAL LIFE AND RURAL CHURCH CONFERENCE

From July 20 to July 26 there will be held the Fourth Annual Rural Life and Rural Church Conference. The College is planning to make this a short course in rural economics and social problems for the pastors, Sunday-school superintendents, teachers, and members of other organizations interested in revitalizing rural and village neighborhood life. Every church, Sunday school, and society or club in Kansas is invited to send one or more delegates to this conference. Some of the best men in the country will lead the discussions.

There will be regular lectures and recitations each day in agriculture, rural sociology, economics, and modern methods of community building.

During the afternoons the College will plan for demonstrations in stock judging, grain judging, trips to the experimental plots, demonstration fields, gardens, and orchards.

On the Fourth of July there will be a demonstration of a sane Fourth. This demonstration should be very helpful to all pastors who expect to be leaders in community building.

Courses in the Summer School

AGRONOMY

Dean JARDINE.
Assistant Professor LEIDIGH.
Assistant THROCKMORTON.

These courses will not be offered for less than ten students.

FARM CROPS. Class work, two hours. Laboratory work, four hours. Two credits.

This is a study of corn, largely from the standpoint of production. The history and botanical characters of the plant are considered. The structure and the manner of growth of the roots, culms, leaves, and inflorescence are studied in detail. The origin of the varieties and the improvement through selection and breeding receive special attention.

The importance of high vitality, the effect of climate on the crop, and the distribution of corn over the United States are considered. Seed-bed preparation and planting and cultural methods are discussed. Methods for the eradication and destruction of weeds and insect enemies which

largely affect the yield of this crop are considered. Methods of harvesting, storing and marketing are also taken up. Text, Hunt's *Cereals in America*.

Laboratory.—The laboratory work consists of a study of the actual plant and ears of corn. A study in variation is made with different types of plants and with different shapes of ears and kernels as illustrations. Differences in texture and structure of kernels of the same type and of different types of corn are studied. Practical demonstrations of seed germination are made. A study of the worth of individual ears, according to the best known standards, constitutes a part of the work. The commercial grading of corn is illustrated and studied.

FARM CROPS III. Class work, six hours. Laboratory work, four hours. Four credits. Prerequisite: Farm Crops I.

A study of forage and fiber crops, with special reference to their importance, history, method of development, growth, distribution, culture, and uses. The culture and adaptation of perennial grasses for hay and pasture are considered. Annual forage crops, including not only sorghums, rape, millets, and legumes, but also corn, wheat, and rye, which are commonly known as cereals, but which are also used for silage, soiling, fodder and hay, are studied. Attention is given to the planting, culture and uses of both annual and perennial legumes, root crops, and fiber crops. The relative feeding value of the respective crops for different purposes, whether for silage, soiling or hay, is taken into account. The cultural methods best suited to individual crops, the character of the soil, the lay of the land, etc., receive their share of attention. Text, *Forage and Fiber Crops*, by Hunt.

Laboratory.—In the laboratory both sheaf and mounted specimens of these crops are studied. In the greenhouse about fifty types of forage plants are kept growing for laboratory use. The student is, therefore, given an opportunity to become familiar with the structure of the plant, the arrangement of the leaves, inflorescence, etc.—information that can be obtained only by studying the plant itself. The student is also taught to identify the different tame grasses and clovers and their seeds, with special reference to quality, purity, and freedom from adulterants, and weed seeds. Commercial hay grading is likewise made a part of the work.

SOIL MANAGEMENT. Class work, three hours. Laboratory work, four hours. Two credits.

This course comprises a study of the management of farm soils, and deals with: the origin of soils and their physical nature; the effect of different methods of cultivation upon the liberation of plant food; consumption of moisture, and physical condition of the soil; the effect of different crops and different systems of farming upon the depletion and conservation of soil fertility; the use of barnyard manure, including proper methods of handling, preserving and applying.

Laboratory.—The laboratory exercises supplement the class work in demonstrating the principles of soil management, as outlined in the class.

ANIMAL HUSBANDRY

Professor COCHEL.
Instructor WRIGHT.

LIVE STOCK I. Class work, one hour. Laboratory, four hours. Three credits.

This course consists of a study of the market types and classes of hogs and horses.

Laboratory.—Practice in judging.

LIVE STOCK II. Class work, one hour. Laboratory, four hours. Three credits.

This course comprises a study of the market types of sheep and cattle, including both the feeder and the fat classes. The different grades and classes of wool also receive careful attention.

Laboratory.—Practice in judging.

PRINCIPLES OF FEEDING. Class work, four hours. Four credits. Prerequisite: Agricultural Chemistry.

This course involves a study of the digestive system and processes of nutrition, and the theory of practical economy of rations, both for the maintenance and for the fattening of all classes of farm animals.

DAIRYING

Professor REED.
Assistant RUDNICK.

DAIRYING. Class work, four hours; laboratory, eight hours. Four credits.

A general course in dairying, dealing with the secretion, composition and properties of milk; care of milk and cream on the farm, a study of the different methods of creaming; construction and operation of farm separators; principles and application of the Babcock test; use of the lactometer; and butter making on the farm. Lectures supplemented by textbook.

Laboratory.—Practice in operating the Babcock test and lactometer; separation of milk and farm butter making.

LIVE STOCK III. Laboratory, eight hours. Two credits.

Judging dairy stock from the standpoint of economical production and breed type. Score cards are used to teach the student to become accurate, thorough and systematic in the selection of animals as representatives of breeds, or for feeding purposes.

HORTICULTURE

Professor DICKENS.
Assistant Professor AHEARN.

PLANT PROPAGATION. Class work, six hours; laboratory, eight hours. Five credits. Prerequisite: Plant Anatomy.

A discussion of the natural and cultural methods of propagation; seeds, seed testing, and seed growing; treatment given to different classes of seeds; the production of seedlings for stock; grafting, budding, layering, making cuttings, and the special requirements necessary in propagating commercial fruits and ornamental plants. Lectures and assigned readings.

Laboratory.—Practical work in the preparation of seeds, seed testing, the preparation of seed beds, the use of seeding machinery, transplanting, grafting, budding and general nursery practice.

LANDSCAPE GARDENING. Class work, four hours. Two credits.

Lectures on the principles of landscape art and the means of their application to the problems of improving lawns, yards, country homes, school grounds, and larger plantations; and an acquaintance with species used for obtaining results.

ORCHARDING. Class work, six hours. Three credits. Prerequisites: Plant Propagation and Pomology II.

A discussion of the conditions necessary for success with orchards. Location, improvement of soil, application of fertilizers, pruning, prevention of loss from frost, marketing and storage.

POULTRY

Professor LIPPINCOTT.

POULTRY I. Lectures, four hours. Two credits.
This is a general course dealing with the value and importance of the industry and the management of poultry on the farm.

DRAWING AND ART

Professor WALTERS.

PUBLIC SCHOOL DRAWING. Laboratory course, eight hours.
This course presents free-hand and object drawing and some water-color and crayon work for rural and grade schools. The state text in drawing is used and the course is especially designed to be helpful to teachers in using these books.

COLOR AND DESIGN I. Laboratory course, eight hours.

This course consists of a study of color combinations based on spectral color. It includes the development of problems illustrating changes of hue and value. The principles of design are also developed by problems and closely related to the color studies. A notebook is required to be kept, consisting of outlines given by the instructor and of original work of the student.

COLOR AND DESIGN II. Laboratory course, eight hours.

This course continues the study of the principles of color and design. Practical applications to dress and to home environment are made.

NOTE.—Color and Design II must be preceded by course I, and will not be given unless a sufficient number of students with preliminary training present themselves.

MANUAL TRAINING

Assistant Professor BRAY.
Assistant Professor CARLSON.
Instructor HOLLAR.
Assistant PARKER.
Assistant DAVIS.

WOODWORKING FOR THE GRAMMAR GRADES. Ten hours, laboratory.

A careful study of the tools and processes used for woodworking for these grades. Lectures, discussions, and reports on methods of introducing and teaching this work. A course of suitable exercises for pupils of this age will be made, together with the construction of models, showing progressive steps, for class use.

WOODWORKING FOR THE HIGH SCHOOLS. Ten hours, laboratory.

A course in woodworking for high schools, in which a number of the most important exercises in joinery are carried out, with a study of their application, after which a series of articles in practical cabinet construction are made, with a study of the proper method of ornamenting and finishing. Lectures, discussions and reports.

WOOD TURNING. Ten hours, laboratory.

A course designed to prepare teachers for teaching wood turning in high schools. The work includes typical application of tools and tool processes, in turning between centers, on faceplates, and by means of hollow chucks. Exercises are given in turning cylinders, cones, beads, convex and concave curves, after which articles are made from drawings, which have a practical application in a student's home or social life, such as handles, mallets, rolling-pins, circular boxes with covers, Indian clubs, dumb-bells, napkin rings, bowls, towel rings, typical vase forms, cups,

goblets, frames, ornamental stools, etc. While many of these articles are made from blue prints, it is the aim to have the student make some objects of value from his own designs, both as a project in turning and as a practical lesson in designing.

In connection with the laboratory work a careful study is made of the commercial value of wood turning, kinds of wood suitable for this work, methods of polishing and finishing work in the lathe, together with a study of suitable power transmission, shafting, belting, tight and loose pulleys, proper speed, etc.

ADVANCED WOODWORKING. Ten hours, laboratory.

A continuance of Woodworking for High Schools, in which an opportunity is furnished for taking more advanced cabinet construction, including wood carving and inlaying.

FORGING. Ten hours, laboratory.

In this course the field of hand-forging as related to high-school work is covered. The work includes practical exercises in making articles of use, which involve the operations of drawing, upsetting, welding, twisting, splitting, and shaping. Sufficient instruction is given the student in the forging of tool steel to enable him to make and temper many of the tools that will be needed in this and other branches of manual training in the high school. Lectures, discussions, and reports.

MACHINE-SHOP WORK. Ten hours, laboratory.

This course includes both bench and machine-tool work, and is designed to familiarize the student with some of the fundamental operations in a modern machine shop, as well as to indicate a method of working out a series of practical exercises with a more limited equipment. Lectures, discussions, and reports.

MANUAL TRAINING METHODS AND ORGANIZATION. Class work, four hours.

A course dealing with the history of manual training in the United States, as well as a similar development in foreign countries. A study is made of the different systems, the various forms of hand work and the grades to which they are best adapted; the methods of teaching this work in elementary and secondary schools; the equipment and material required for each of the various lines of work; together with their cost and when they can be secured, also the best arrangement of equipment and its proper installation. The course will include lectures, recitations, discussions, reading and written reports.

MANUAL TRAINING FOR PRIMARY GRADES. Ten hours, laboratory.

This course is designed to give instruction to teachers in those forms of hand work that have been found most profitable in the lower grades. The possibilities and adaptations of the different mediums are studied and methods of teaching the work are carefully considered. This work will include weaving, cord work, raffia, reed work, and cardboard construction. Lectures, discussions, and reports.

NOTE.—The number of hours of credit in each course offered in shop work will depend upon the amount and quality of work completed.

HOME ECONOMICS

Assistant Professor Dow.
Miss RIGNEY.
Miss LINDSEY.
Miss HUMFELD.
Miss PETERSEN.
Miss DONALDSON.

DOMESTIC SCIENCE.—PRESENTATION OF DOMESTIC SCIENCE. Two hours. No credit.

This is a study of method of presentation of domestic science in grade and high schools. Attention is given to the application of the general principles of teaching to the teaching of domestic science; to the planning of lessons and courses outlined, and to the equipment of laboratories.

DOMESTIC SCIENCE.—FOOD PREPARATION I. Class work, two hours; laboratory, eight hours.

Foods are classified according to similarities in composition, which divide them into groups representative of the five food principles: carbohydrates, fats, proteins, mineral matter, and water. The carbohydrates and the fats are studied as to classification, composition, occurrence, and general properties.

Laboratory.—Principles underlying the cookery of the carbohydrates and the fats are illustrated in the preparation of representative foods.

DOMESTIC SCIENCE.—FOOD PREPARATION II. Class work, two hours; laboratory, eight hours. Prerequisite: Food Preparation I.

This course is a continuation of Food Preparation I. It includes the study of the proteins and of the leavening agents.

Laboratory.—Principles underlying the cookery of proteins are illustrated by preparation of representative foods; practice is given in bread making and in cake making.

DOMESTIC SCIENCE.—SPECIAL NONCREDIT COURSE. Class work, four hours; laboratory, four hours. Prerequisite: Food Preparation I and II.

A study of foods from standpoint of needs of the body, function and digestion of different classes of food; food habits and dieting standards.

Laboratory.—Planning, preparing and serving meals to satisfy different dietetic conditions.

DOMESTIC ART.—PRESENTATION OF DOMESTIC ART. Class work, two hours. No credit.

This course considers the relation of household art to education; the method of teaching it in various kinds of schools, its relation to the curriculum; the planning of lessons and courses of study, and problems of equipment and cost.

DOMESTIC ART.—TEXTILES. Class work, four hours.

This course will present the subject of textiles, including such topics as their beginnings in the art of primitive people. The study of fibers—cotton, wool, silk, flax; the manufacture and evolution in spinning and weaving.

DOMESTIC ART.—HAND AND MACHINE SEWING. Class work, two hours; laboratory, sixteen hours.

Hygiene in relation to clothing; suitability of clothing dependent on climate, occupation and general health; care and cleaning, repairing, relation of cost of clothing to income.

Laboratory.—Practice in hand and machine sewing as presented in the grades and high schools.

DOMESTIC ART.—GARMENT MAKING. Class work, two hours; laboratory, eight hours. Prerequisite: Hand and Machine Sewing.

Study of clothing; economics of spending; cost of clothing. Materials

affected by adulterations; bargain sales; sweat-shop labor; quality, economy in selection, conditions affecting the hygienic and economic value of clothes.

Laboratory.—Drafting and making a shirt-waist dress.

DOMESTIC ART.—DRAFTING, DRAPING AND DESIGNING. Class work, two hours; laboratory, eight hours. Prerequisite: Garment Making.

Principles of design and combinations of color as applied to dress. Laboratory practice in drafting patterns and draping from original or copied designs.

DOMESTIC ART.—DRESSMAKING. Laboratory, twelve hours. Prerequisite: Drafting and Designing.

This course consists of making a simple cloth dress.

BOTANY

Professor ROBERTS.
Instructor JEHLE.

AGRICULTURAL BOTANY. Laboratory, eight hours.

The purpose of this course is to give high-school teachers a method of teaching botany that will bring the subject into closer relation to the farm and its problems. It is an attempt to render possible the study of botany in a scientific sense, but by the use, so far as practicable, of strictly economic plants for laboratory material. Considerable emphasis is laid on the study of plants from the natural-history standpoint. Most of the larger and more important groups of plants are studied from this point of view. The course will fall into the following divisions: (1) The plant and its work, two weeks; (2) the kinds of plants, one week; (3) the diseases of plants, one week; (4) weeds and their eradication, one week; (5) the improvement of plants, one week.

CHEMISTRY

Dean WILLARD.
Assistant Professor WHELAN.
Instructor HUGHES.

CHEMISTRY I. Lectures and recitations, six hours; laboratory, four hours. Four credits.

The term's work begins the study of elementary inorganic chemistry, and covers the elements of oxygen, hydrogen and chlorine and their compounds, this being accompanied by theoretical treatment of the subjects of matter, energy, properties of gases, chemical law and theory, solution, electrolytic dissociation, acids, bases and salts, and chemical change as related to light, heat and electricity. Newell's *Inorganic Chemistry for Colleges* is used, this term's work covering the first 209 pages. The text is supplemented by lectures and amply illustrated by experimental demonstrations.

Laboratory.—As far as the time permits, the student performs independently experiments touching the preparation and properties of the more important substances. Preference is given to those operations which illustrate important principles, and the student is required as far as possible to study experiments in that light. *Laboratory Exercises in Elementary Chemistry*, by William McPherson, is used as the laboratory guide.

CHEMISTRY II. Lectures and recitations, six hours; laboratory, four hours. Four credits.

The work under this head is a continuation of the study of elementary inorganic chemistry, and includes the elements nitrogen, carbon and sulphur and their compounds, and consideration of atomic and molecular weights, valence and classification of the elements. These subjects are

included in pages 210 to 355 of Newell's *Inorganic Chemistry for Colleges*.

Laboratory.—The laboratory work this term is a continuation of that begun in the preceding.

CHEMISTRY III. Lectures and recitations, six hours; laboratory, four hours. Four credits.

This work completes the study of elementary inorganic chemistry begun in the preceding terms, and includes consideration of fluorine, bromine, iodine, silicon, phosphorus, arsenic, antimony, and the metals.

Laboratory.—The laboratory work in this course is a beginning in qualitative analysis, for which McPherson's *Elementary Treatise on Qualitative Analysis* is the guide.

ELEMENTARY ORGANIC CHEMISTRY. Eight hours per week. Four credits. Chemistry III is a prerequisite.

A systematic study is made of examples of the more important classes of organic compounds in their logical chemical relations. Such substances as the hydrocarbons, alcohols, organic acids, fats, soap, sugars, starch, proteids, and other less known substances are treated with greater detail. Compounds used for clothing, food, fuel, light, antiseptics, disinfectants, anesthetics, poisons, medicines, solvents, etc., are included. The subject is amply illustrated by experiments in the lecture room.

EDUCATION

Professor HOLTON.

HISTORY OF EDUCATION. Seven and one-half hours. Four credits.

This course will cover in the usual way the general history of educational progress from the earliest times to the present, except the educational development in the United States.

METHODS OF TEACHING. Seven and one-half hours. Four credits.

This course presupposes a term of work or more in psychology. Part of the time will be devoted to the problem of general educational theory, and the remainder to a consideration of methods of presenting the several branches of study.

SCHOOL ADMINISTRATION AND LAW. Seven and one-half hours. Four credits.

This course will include a consideration of such subjects as the following: School and classroom management, the relation of the various ranks of school officers to one another, administrative measures and methods as practiced by state, county and local school authorities, and the important features of the Kansas school law.

THE PHILOSOPHY OF EDUCATION. Seven and one-half hours. Four credits.

This course will cover a careful discussion of the general aims and purposes of education. It will consider briefly the contribution of the great schools of science and art and discipline toward the relaxation of the general aim of education, and will attempt to lead the student to an understanding of how all the foregoing agencies are brought together in a larger unifying force.

HISTORY OF EDUCATION IN THE UNITED STATES. Seven and one-half hours. Four credits.

This course will include a consideration of the beginnings and the development of the various divisions and ranks of educational institutions in the United States. It will also give considerable attention to present-day tendencies in educational progress in this country.

VOCATIONAL EDUCATION. Six hours. Three credits. Elective.

The development and significance of vocational education; careful study of trade and continuation schools in Germany, Massachusetts and elsewhere; practical schools of agriculture in France; folkehøjskoler (people's high schools) in Denmark; agricultural colleges in the United States; Wisconsin and Minnesota county schools of agriculture and home economics; the social and economic phases of vocational education for the producer; its relation to moral welfare and social conditions; its place in the city, town and county schools; outlining of tentative courses in shop work, agriculture and home economics for Kansas schools; the relation of vocational education to the other school subjects; plans, equipments and cost of shop and laboratories. A study of the principles of pedagogy as applied to the teaching of vocational subjects in the high school and in the seventh and eighth grades.

VOCATIONAL GUIDANCE. Two hours. One credit, if taken with vocational education.

A study of the need of vocational guidance for pupils in the seventh and eighth grades and the high schools; economic and social waste without guidance; a study of the economic and social possibilities of the different vocations; how to study the vocations; bureaus of vocational guidance; the social engineer; the teachers as vocational counselors; a study of the literature on the subject. This course is especially intended for teachers of pupils in the upper grades and high schools, the high-school principals, village and ward-school principals, and superintendents of city schools.

ENGLISH

Assistant Professor OSTRUM.
Instructor ADA RICE.

LITERATURE FROM THE READERS. Eight hours. Four credits.

This course is planned to meet the needs of teachers of rural and graded schools. The aim of the course is to stimulate the teacher's love for good literature until she becomes conscious of her power to interest, impress and inspire boys and girls. Reading is considered both as a fundamental means of acquiring knowledge and as a stepping-stone to the appreciation of the world's best literature. Special emphasis will be placed upon teaching children how to study the reading lesson and upon the necessity to use in the reading lessons more of the literature of rural life. One hour each week is devoted to special methods of teaching reading.

CONSTRUCTIVE ENGLISH. Eight hours. Four credits.

This course is of special value to grammar-grade and high-school teachers desiring to learn practical present-day methods of teaching language and composition. The aim of the course is to train the student to express his thoughts clearly and accurately. The assignments of work are based on the experience and vital interests of the students, thus stimulating clear thinking as a practical basis for clear-cut, effective writing. One hour a week is devoted to the discussion of special methods of teaching grammar-grade and high-school English, and to a definite working program in the teaching of English.

AMERICAN LITERATURE. Eight hours. Four credits.

This course is designed for those desiring to take a special cultural course in literature, and is open to all who have completed the course in college rhetoric or its equivalent. The course includes a rapid survey of American literature from colonial times to the present and the intensive study and appreciation of the works of representative men of letters. Suggested supplementary readings enable the student to explore the richest fields of American literature. One hour a week is devoted to a consideration of current literature.

HIGH-SCHOOL CLASSICS. Eight hours. Four credits.

This course is intended especially for those teaching or desiring to teach high-school English and literature. The class work consists of lectures by the instructor, supplementary readings, and of interpretation by the class of passages assigned for study. The aim of this course is to awaken warm, vital appreciation of the best literature for high schools, and to inspire teachers to bring the deeper message of that literature to the hearts of the pupils. One hour each week is devoted to a discussion of the best methods of teaching literature and English in the high school.

ENTOMOLOGY

Assistant Professor DEAN.

ECONOMIC ENTOMOLOGY. Eight hours. Four credits.

This course is an elementary study of the dynamics of injurious insects. It consists of (1) a study of such structural features of insects as is necessary to the understanding of their elementary classifications, of their life history, and of the application of remedial measures; (2) a study of the recognition marks, distribution, habits and life histories of the principal insect pests of the field, orchard and garden, domestic animals, and the household; (3) a study of the standard methods of their control. Several field trips are made to observe and study the habits of the insects in their natural environment.

HISTORY AND CIVICS

Professor PRICE.
Instructor TAYLOR.
Instructor ILES.

AMERICAN HISTORY I.—To 1845. Seven and one-half hours. Four credits.

This course will cover the industrial, constitutional, and political phases of our American history, including origin, foundations, evolution from colonial conditions, to independence, the establishing of nationality, our westward expansion, and the questions of the middle period. Library readings and reports; lectures and quizzes.

AMERICAN HISTORY II.—Since 1845. Seven and one-half hours. Four credits.

This course continues the study of the industrial, constitutional and political phases of American history, beginning with the annexation of Texas, and an intensive study of the slavery issue. It includes especially the economic, social and industrial conditions and effects of the Civil War, covers the reconstruction era, and includes such a study of the new nation as to give the student a clear grasp of present-day problems. Library readings and reports; lectures and quizzes. Students in either this or the above course are advised to bring any texts that they may possess on American history or government.

ENGLISH HISTORY. Seven and one-half hours. Four credits.

A survey of the whole field, with special emphasis on the modern period. The Tudor and Stuart regimes, with their bearings on constitutional development and New World history; the growth and organization of the empire and the more recent industrial, social and political advances will be studied in detail. Based on Cheney as a text, with lectures and assigned readings. A good course to precede civics and American history.

ANCIENT HISTORY, TEACHERS' COURSE.* Seven and one-half hours. Four credits.

This course will include a survey of Oriental history, with a special study of selected periods and phases. It will be based on a standard text, with lectures and assigned readings. Some attention will be given to problems of presentation. A brief portion of the time will be given to the examination and discussion of the various textbooks in general use and to helps of all kinds. This course is designed for those who expect to teach ancient history in the high schools, but should be of value and interest to any others who desire advanced work in this period of history.

INDUSTRIAL HISTORY.* Seven and one-half hours. Four credits.

A course tracing from their beginning in the colonies all of the great industrial and social movements in our history, with their constitutional and political bearings, and closing with a survey of the great questions of labor and capital, control of corporations, transportation, agricultural economics, conservation and others that are absorbing the attention of the public to-day. Coman's *Industrial History of the United States* is used as a text, supplemented by lectures and assigned library work.

KANSAS HISTORY. Four hours. Two credits.

A complete course in Kansas history, including a rapid survey of the long preterritorial period and the question of slavery in the territories, and a more thorough study of territorial and state history, with its bearings upon national affairs. An attempt will be made to trace the industrial, social and political progress of Kansas to the present day. For the benefit of those expecting to teach Kansas history in the schools a limited time will be devoted to the discussion of the state text and the methods and aids in handling it. This is a library course, and will be based upon outlines and assigned readings.

CIVICS. Seven and one-half hours. Four credits.

A course in government and politics, with especial reference to the actual operation of local, state and national political machinery, and the newer devices for securing a more effective popular control, such as the direct primary, initiative, referendum, short ballot, and recall. A comparative study of the constitution and government of Kansas is supplemented by a discussion of the present tendencies in legislation and administration. Recitations, lectures, assigned readings. Text, Beard, *American Government and Politics*; or Guitteau, *Government and Politics in the United States*.

MODERN EUROPE. Seven and one-half hours. Four credits.

A course in the development of modern Europe. The period before 1648 is reviewed briefly and special attention is given to the social and industrial development of the various nations since 1815, and to present international relations. This course is designed to meet the needs of the teacher, who, following the suggestions of the Committee of Five, prefers to emphasize the modern period in the high-school course in medieval and modern history. Recitations and assigned readings. Text, Robinson and Beard, *Development of Modern Europe*.

* Of these two, the course which is desired by the larger number of students will be taught.

MATHEMATICS

Assistant Professor ANDREWS.
Assistant Professor WHITE.
Instructor STRATTON.

INDUSTRIAL ARITHMETIC. Eight hours.

This course will have two distinct aims: (1) To obtain a working knowledge of the principles of numbers, both integral and fractional; (2) the practical application of these principles to the problems of the farm and shop. The practical application of mensuration to the measurement of land, approximate and exact computation of volumes and areas, estimating quantities of hay and grain in bulk, will form an integral part of the course. A very large number of practical problems arising from actual experience over the whole field of agricultural science will be made the basis of problem work. Teachers will be furnished the data for a large amount of practical mathematical work. Textbook, state text, supplemented by the instructor's outlines and data.

ALGEBRA I. Eight hours. Four credits.

A course in elementary algebra. The transition from arithmetic to algebra will receive careful attention. Text, *First Course in Algebra*, by Hawkes, Luby, and Touton.

ALGEBRA II AND III. Eight hours. Four credits.

These courses are a continuation of elementary algebra, including the general theory of the quadratic equation. Text, *First Course in Algebra*, by Hawkes, Luby, and Touton.

PLANE GEOMETRY I AND II. Eight hours. Four credits.

The usual theorems and construction, including the general properties of plane, rectilinear figures, the circle, the measurement of angles, similar polygons, arcs, regular polygons; the solution of original exercises, including loci problems and the application to the mensuration of lines and plane surfaces. Text, Wentworth-Smith *Plane Geometry*.

SOLID GEOMETRY. Eight hours. Four credits.

The usual theorems and construction, including the relation of the planes and lines in space, the properties and measurement of prisms, pyramids, cylinders and cones, the sphere and the spherical triangle; the solution of many numerical and original exercises, including loci problems; application to the mensuration of surfaces and solids. The application of geometry to the arts and sciences will be made, and in particular the use of engineering and architecture as problem sources will be shown. The course will proceed from the modern pedagogical and practical point of view. Text, Wentworth-Smith *Plane and Solid Geometry*.

COLLEGE ALGEBRA. Eight hours. Four credits.

General review of elementary algebra for sharper definitions. General theory of radicals and the complex number; binomial theorem, infinite series, logarithms, permutations and combinations, determinants, graphical algebra, general theory of equations, roots of unity. Rigor of treatment and practical application to problems in engineering and geometry are objective points in the course. Text, *College Algebra*, by Reitz and Crathorne.

SECONDARY MATHEMATICS. Five hours.

This course undertakes a critical examination of the mathematical field of the secondary school. This embraces a careful examination of the contents of secondary algebra, geometry, and trigonometry; an extensive study of the reports of the International Committee on the Teaching of Mathematics; critical examination of various pedagogical theories

of presenting secondary mathematics; secondary-school programs in mathematics; resources available for secondary instruction; objective points in teaching algebra, geometry, and trigonometry; history and bibliography of secondary mathematics. Lectures, assigned readings, and reports.

PLANE TRIGONOMETRY. Eight hours. Four credits.

Trigonometric functions of any angle. Measurements of angles. Solution of plane triangles. Functions of multiple and submultiple angles. Sum and difference formulas, trigonometric equations, and inverse functions. DeMoivre's theorem, trigonometric series, hyperbolic and exponential functions. The use of trigonometry as a scientific instrument and as a part of a liberal education will be emphasized. Text, Rothrock's *Plane and Spherical Trigonometry*.

ANALYTICAL GEOMETRY. Eight hours. Four credits.

The work of this course is confined to the plane, and includes a treatment of coördinate systems and applications, loci, the straight line, circle, parabola, ellipse, and hyperbola; also a brief consideration of secants, tangents, and normals. The subjects treated are those usually embraced in a first course. Text, *A Brief Course in Analytic Geometry*, by Tanner and Allen.

DIFFERENTIAL CALCULUS. Eight hours. Four credits.

Following the usual introductory ideas, the principal topics taken up are the fundamental rules for differentiating standard forms, applications, maxima and minima, curve tracing, curvature, and partial differentiation. Especial attention is given to the applications of the calculus to problems in geometry and mechanics. Textbook, *Differential and Integral Calculus*, by Granville.

INTEGRAL CALCULUS. Eight hours. Four credits.

This course contains a discussion and practical use of formulas for integrating standard forms, a treatment of the constant of integration, and the idea of the definite integral. Emphasis is placed upon the application to curves in problems involving areas, lengths, surfaces and volumes, rather than upon the various methods of integration. Attention is given to both single and multiple integration in connection with the usual problems in geometry and mechanics. Textbook, *Differential and Integral Calculus*, by Granville.

PHYSICAL EDUCATION

Professor LOWMAN.
Miss ENYART.

These courses are offered to meet the needs of teachers who wish to qualify themselves for more efficient direction of and instruction in physical education in the public schools. The courses are planned to meet the needs in both theoretical and practical phases of the work. The course in practical work will be beneficial to those who are interested in their own health development. Hours of credit will depend upon amount of work.

I.—PHYSICAL EDUCATION IN THE PUBLIC SCHOOLS.

This course will consist of lectures and discussions three times a week, with one hour for outside reading. History and development of physical education; present status. The development of the rational system of physical education.

Elementary Schools.—Emphasis is placed on the growth and development of the child, the factors controlling this growth and development, and the place of motor activities among these factors. Organizations

and methods discussed in detail. The introduction of rational gymnastics, plays, and games.

High Schools.—Following a summary and study of the characteristics, tendencies and needs of adolescence, this course considers the exercises to be used, the condition of the individual students, the methods of studying such conditions, the social and moral leadership necessary, and the administration of competitive exercises, especially athletic.

II.—PLAYGROUNDS.

Methods.—This course treats of the development of the playground movement in the United States; the necessity of the playground; playgrounds in the large city; in the small town; how to start and maintain playgrounds; supervisory organizations, location, construction, and administration.

Suggestions to the playground directors in regard to (a) the educational value of directed play, (b) equipment of the grounds, (c) publicity work, (d) time and hours, (e) the daily playgrounds, (f) special days, (g) clubs, (h) government on the playground, (i) activities to encourage, (j) the special games for the playground, with special emphasis to the rural problem.

III.—THE TECHNIQUE OF COMPETITIVE SPORTS.

This course is divided into a series of courses covering the special technique and methods of organizing and coaching the different sports. Training principles will be emphasized under each course. The courses will be conducted by lectures, demonstrations and actual work on the field of play. This course is offered to cover football, basket ball, and baseball. (For men.)

IV.—PRACTICAL WORK.

This course offers the opportunity for practice in free-hand gymnastics, dumb-bells, clubs, wands, elementary apparatus work, playground and gymnastic games. Opportunity will also be given for swimming.

V.—WOMEN'S DEPARTMENT.

This course offers the opportunity for practice in: (A) Folk dancing, rhythmic movements, graded free exercises, wands, dumb-bells, clubs, and elementary apparatus work. All exercises given can be easily adapted to the school room. (B) Story plays for primary, and games adapted to large classes for use in the grammar and high schools. Instruction in coaching the more highly organized games—captain ball, and basket ball. Swimming will also be given two or three hours per week.

PHYSICS

Professor HAMILTON.
Instructor FLOYD.
Assistant ALLEE.

PEDAGOGY OF PHYSICS.—Class work, six hours a week; laboratory and library, four hours. Four credits. This course includes a study of the modern texts, manuals and methods in high-school physics. Students are given an opportunity to help assemble apparatus and to assist in lecture demonstrations. The laboratory work will include the usual experiments required in the elementary course in physics. The purpose of the course is to discuss methods best adapted for the presentation of those topics which present special difficulty, to devise methods of illustrating and demonstrating the fundamental principles, and to select from a large number of possible laboratory experiments a list which might be used in any of our Kansas high schools. This course is intended for those who are either teaching or expect to teach physics in secondary schools.

INSTRUMENT MAKING AND REPAIR. Shop and laboratory, ten hours. This course is designed for physics teachers and students who are interested in increasing the efficiency of the physics laboratory of the high schools. The course includes designing apparatus; advice in regard to buying apparatus in raw materials; equipment for the apparatus repair shop, the physics laboratory. The efficiency of the laboratory can be greatly increased by organizing and making use of the available materials and energies. Students are asked to bring to the course, if possible, pieces of apparatus which are out of repair; also to note the needs of a particular laboratory in which they are interested. This course is offered in answer to the needs of the high-school physics laboratory, as determined by recent investigation of existing conditions.

ELECTRICITY AND LIGHT. Class work, six hours; laboratory, four hours. Four credits.

An advanced course in electricity and light. The course is the same as is required of all engineering and general science students, and gives the student a working knowledge of the units employed in measuring current, the various methods of producing current, and acquaints him with the electrical appliances used in both current production and electrical measurements. The work in light covers the principal phenomena of light, with a study of light as an exact means of physical measurement. The laboratory work includes the work with generators and motors, photometers, lamp tests, spectrometer, and advanced problems in both electrical measurements and light. Text, Kimball.

For the benefit of those who wish credit in elementary physics the following courses are offered:

ELEMENTARY PHYSICS C I. Class work, six hours; laboratory work, four hours. Four credits.

This work is intended to give a general review of the subject of mechanics and heat. Especial emphasis is placed on those principles which will be met again in later work in the same or other sciences. The laboratory work consists of a study and manipulation of instruments used in accurate measurement and observations. The measurements taken will be made the basis of problems to illustrate the various laws discussed in the classroom. Text, *Mechanics and Heat*, by Carhart and Chute.

ELEMENTARY PHYSICS C II. Class work, six hours; laboratory, four hours. Prerequisite: Elementary Physics I.

This course is a continuation of the preceding course, and includes a study of electricity, sound and light; a discussion of the more important laws involved in each, together with experiments and demonstrations of many of the everyday phenomena, is followed by problems. Fundamental laws in electricity are studied and illustrated and the working principles of many of the electrical appliances in daily use will be made subjects for class discussion. The laboratory work consists of measurements in reflection and refraction, the use and construction of cells, simple forms of wiring, and the use of instruments for measuring current.

ZOOLOGY

Assistant Professor NABOURS.

ECONOMIC ZOOLOGY. Eight hours. Four credits.

Field trips are made regularly each week to selected areas, meadows, woods, ponds and streams, and to the growing crops on the College farm. The animals found are studied in nature with regard to their relations to the species, to other animals, and to man. The conditions of the habitat and food supply are given particular attention. The various stimuli which the environments seem to afford are noted, and so far as possible the responses of the animals to these stimuli are studied. Be-

sides the study of general zoölogy, which makes the course equivalent to General Zoölogy I of the regular course, special elementary studies of the following economic phases are made: parasitology, injurious mammals and inheritance; and, accompanied by the entomologists, a brief field study of the chinch bug, corn-ear worm, and a few fruit insects at work, and the means of control. The indoor laboratory exercises consist in caring for the live forms in the aquaria and cages, and experimental studies in tropisms—the responses of the living organisms to the various stimuli, such as light, temperature, moisture, chemicals. These studies are correlated with the observations made on the field trips, and the data obtained are applied in the construction of working principles.

Division of College Extension

JOHN HAROLD MILLER, Dean.

Until 1905 the work of college extension, in the form of farmers' institutes, was in charge of a farmer's institute committee of the College. Applications for college lecturers at the institutes were referred to this committee, and such members of the Faculty as happened to be available were detailed to attend the meetings. The State appropriation for institute work was small, no regular staff could be employed, and the institutes themselves were for the most part unorganized and of a temporary and sporadic character. The first step toward the development of the institute work was taken in the employment by the Board of Regents of a superintendent, who assumed the responsibilities of the organization of the work in October, 1905. In July, 1906, the Department of Farmers' Institutes was formally organized by the Board of Regents. An energetic prosecution of the work of agricultural extension had resulted in an awakened interest throughout the State, and in a legislative appropriation of \$4000 in 1905, to which amount the College added \$800. In 1907 the results of the extension work were seen to be so valuable that the legislature appropriated \$11,500, to which the College added \$1000. In 1909 the legislature, with unprecedented liberality, made an appropriation for agricultural extension work of \$52,500, just five times the appropriation made by the preceding legislature. The legislature of 1911 appropriated for this department \$35,000 for the year ending June 30, 1912, and \$40,000 for the year ending June 30, 1913. The legislature of 1913 appropriated for the Division of College Extension, \$45,000 for the year ending June 30, 1914, and \$50,000 for the year ending June 30, 1915.

The many developments of the extension work made it necessary, in the judgment of the Board of Regents, to create in December, 1912, the Division of College Extension, consisting of four distinct sections—the Department of Farmers' Institutes and Demonstrations, the Department of Highway Engineering and Irrigation, the Department of Home Economics, and the Department of Correspondence-Study—each with its own head and staff; the Board of Regents made the Director of Extension, Dean of the Division of College Extension.

The principal value of the Agricultural College, as a teaching factor, must be in the training it is able to give to the

young people who enter upon and continue through its courses of study, in residence. The Agricultural Experiment Station, as a natural adjunct to the College, has its great field in the discovery of new truths relating to agriculture. So long, however, as the institution limits its efforts to these lines, it is evident that only a small proportion of the people of a state can derive direct and practical benefit from the work of the College. The progress of agricultural education would be slow indeed if the Agricultural College did not offer other forms of instruction to the people of the State. The same economic principle that justified the expenditure of public funds for educating young people who are able to attend the College justifies a similar expenditure for the purpose of taking the College to those who are not able to come to it. State education is not philanthropy, but self-protection—foresight. An educated citizenship is a prosperous citizenship. The Kansas State Agricultural College, through its several lines of extension, conducted meetings during the year ending June 30, 1912, with an aggregate attendance of 349,967 people—more than one-fifth of the population of the State.

While this work is directed by the Division of College Extension, the scope would be very limited were it not for the co-operation of the other divisions and departments of the College in supplying speakers for institutes, assistants in various lines of demonstration work, teachers for movable schools, and wise counsel in the various lines of public effort.

Farmers' Institutes and Demonstrations

EDW. C. JOHNSON, Superintendent.
P. E. CRABTREE, Farm Crops.
G. C. WHEELER, Animal Husbandry.
GEO. O. GREENE, Horticulture.
A. S. NEALE, Dairy Husbandry.
C. D. STEINER, Boys' Clubs.
W. A. BOYS, Demonstration Agent, West Central Kansas.
CLYDE MCKEE, Demonstration Agent, Northwestern Kansas.
G. E. THOMPSON, Demonstration Agent, Southwestern Kansas.
H. J. BOWERS, Demonstration Agent, Southeastern Kansas.

The farmers' institutes of the State have regular officers, constitutions and by-laws, and are required by law to meet at least annually. Many of these organizations also hold six or more monthly meetings. The College plans to send one or more speakers to present at a meeting certain well-defined lessons in some branch of agriculture. The speakers and their subjects are chosen because of a known need or interest in a particular community, and with a view to starting or encouraging certain definite lines of agricultural work. Effort has been made to build up a fixed membership in these institutes, and the list of members reported to this department up to March 1, 1913, is about 16,000. This membership roll constitutes the mailing list for the regular pamphlets issued by this department to the members of the farmers' institutes. In addition to

these pamphlets, each member who fills out and returns a membership blank will receive from the College, from the government, or from some State Experiment Station such other obtainable literature as his interests demand. Each year some special topic, such as live stock, plant breeding, gardening, orcharding, or dairying, is made especially prominent in institute programs, either for the whole State or for certain specified districts. Special meetings are held by approximately two-thirds of the institutes, for the discussion, on certain designated days, of special subjects, such as "Alfalfa," "Poultry," "Good Roads," "Seed Selection," "Silos and Silage," "The Farm Horse," etc.

The programs for all regular meetings are based on suggestive outlines sent out by the Institute Department. When these are returned by the local committees, the programs and posters are printed and sent out free. The department furnishes literature, on request, for members who are to take part in the program of an institute, a grange, or other organization. During the campaign beginning September 1, 1912, and ending March 15, 1913, the College assisted in the holding of 183 two-day institutes and 221 one-day institutes—a total of 404 institutes, having an aggregate attendance of more than 73,320 farmers, with their families.

MONTHLY MEETINGS

One of the most important features of the farmers' institute work in this State is the custom of having each farmers' institute organization hold from six to nine monthly meetings. These meetings are held usually on the afternoon of the second Saturday of each month from September to May. The Department of Farmers' Institutes suggests the subject for discussion, and the same subject is to be discussed in each and every institute in the State. In this way certain very important subjects have been discussed by thousands of farmers at seasonable times, looking to somewhat general unanimity of action. The subjects discussed at these monthly meetings have included such as, "Home Orchard," "The Silo," "Seed-bed Preparation for Corn," "Seed-bed Preparation for Wheat," "Care of Brood Sow and Litter," "Sorghum," "Road Improvement," "Consolidation of Rural Schools," etc. The department has made a requirement that every institute must hold at least three of these monthly meetings, in addition to the annual meeting, before being entitled to aid from the county.

DEMONSTRATION FARMING

GENERAL FIELD DEMONSTRATIONS. After speakers from the Agricultural College have attended institute meetings and discussed certain methods of farming, requests have come from farmers that the College send men into those communities to put to a practical test the theories advocated. Therefore, four or five members of the department have usually spent the time from March to July in various field demonstrations, including pruning and spraying orchards, building silos, inspecting dairy herds, making plans for dairy barns, visiting farmers and advising as to farm management, etc.

DISTRICT DEMONSTRATION AGENTS. In addition to the advisory demonstration work indicated in the preceding paragraph, the College has em-

ployed four district demonstration agents, one with headquarters at Norton, with demonstration work in several counties in the northwestern corner of the State, having the coöperation of the Rock Island Railway Company and the United States Department of Agriculture in meeting salary and expenses. Another district demonstration agent has been located at Hays, conducting work in counties along the Union Pacific lines in western Kansas. A third district demonstration agent has been located at Dodge City, conducting demonstrations in the counties in the southwestern part of the State, the College being assisted in salary and expenses by the Santa Fe Railway Company and the United States Department of Agriculture. A fourth district demonstration agent has been assigned several counties in southeastern Kansas, with headquarters at Parsons, the College being assisted here by the United States Department of Agriculture. These men conduct demonstrations on from four to six farms in each county in the assigned territory in the growing of crops and in the feeding of stock.

COUNTY DEMONSTRATION AGENTS. The College has assisted in the location of three county demonstration agents in the following counties: Leavenworth, Montgomery, and Cowley. The College, however, assumes no expense for the work of these agents, but directs the various demonstrations.

BOYS' AND GIRLS' CONTESTS

In the hope of creating a keener interest in rural life, contests in growing corn, potatoes, etc., and in baking, fruit canning, and sewing were inaugurated. They are usually considered a part of the work of the farmers' institutes and are for the most part conducted by these organizations. Prizes are arranged for, which in some counties aggregate as much as \$400. Prizes for boys and girls fifteen years old and over are given in the form of free trips to the State institute held at the Agricultural College each winter. This is clearly educational work, and many county school superintendents state that these contests in corn, bread, etc., have stimulated the entire year's work of country schools. Beginning with 1911, the rules for the contest were changed, and three additional recommendations were made: (1) Each boy shall plant one acre of corn, from which his ten ears must be selected for the contest. (2) Any boy may join a yield contest, provided he notify the executive committee of his institute, on or before the first of October, that he thinks his acre will yield, for all territory east of the Sixth Principal Meridian, seventy-five bushels, for the next three counties west (to the west line of Barton and Smith counties), sixty bushels, and in all territory farther west, forty bushels per acre, of corn or kafir. (3) Institute committees are urged to introduce, for boys between the ages of seventeen and twenty-two, a five-acre contest; the contestant to notify the committee on or before the first of October that he thinks his corn will yield seventy-five, sixty, or forty-five bushels per acre, according to territory. The College recommends that the prize for the one winner in this contest be \$50 cash on condition that the winner attend the Farmers' Short Course at the Agricultural College for ten weeks.

BOYS' AND GIRLS' MEETINGS

The College is inaugurating a system of special meetings for the boys and girls who engage in the various contests. This work will usually be conducted in the form of a county campaign, consisting of four or six afternoon meetings a week, for the purpose of reaching the boys and girls engaged in the various contests. When these young people become sufficiently interested the representatives of the College will assist them in forming organizations to be known as the "Boys' Good Farming Club" and the "Girls' Home Economics Club." The College is also organizing, in towns and villages of the State, "boys' poultry clubs" and "boys' garden clubs." "Girls' flower clubs" will also be organized where there are no "city beautiful leagues." Special circuits will be arranged for these boys' and girls' meetings, similar to those of the regular farmers' institutes, and the officers of these clubs will report to a College official as do the officers of the institutes.

MOVABLE SCHOOLS IN AGRICULTURE

As a means of intensifying the work of the farmers' institutes, "movable schools" are to be held in those communities that have high institute records. Schools will be conducted in "dairying," "poultry," "orcharding," "stock judging and breeding," "corn culture," "road making," and "concrete construction." These schools will continue for three days, from nine A. M. to four P. M. There must be a membership of not less than twenty-five or more than forty, and each member must pay a fee of one dollar to meet the necessary expenses. Where a class of sixty is formed, two instructors will be sent and two courses will be offered. In case a single school possesses a total membership of sixty men and forty women, the instruction may be continued for a period of five days.

SCHOOL CAMPAIGNS

A state campaign for agricultural education would be incomplete if it did not affect the rural schools. According to a recent legislative enactment, all teachers are hereafter required to take an examination in elementary agriculture. It is not required that agriculture be taught in the rural schools of the State, but within the next two years it will undoubtedly become a part of the daily course of study of every school in Kansas. In coöperation with the county school superintendents and institute workers, the Agricultural College is each year holding "schoolhouse campaigns" in a few counties, for the purpose of stimulating interest in agriculture among children, teachers, and patrons. In these campaigns the College representative is usually able to speak in four schoolhouses each day, and to give a lecture in the evening, either in a rural schoolhouse or in some village. The representatives sent to the different counties are chosen with reference to the prevailing interests of the respective localities.

AGRICULTURAL TRAINS

The College has enjoyed for several years the coöperation of the leading railroads of Kansas in the matter of special educational trains, such as "corn," "alfalfa," "wheat," "dairy," "drainage," and "good roads"

trains. By this means it has been possible to meet many thousand people and to impress upon them in a forceful way the importance of seed selection, of improved methods of culture, of the value of better dairy stock, silos, etc.

COOPERATIVE ASSOCIATIONS

Another form of effort to make practical the instructions given in the farmers' institutes is the organization of "Coöperative Breeding Associations," "Fruit Growers' Associations," "Vegetable Growers' Associations," "Community Breeding Associations," etc. Year by year greater effort is being made to induce farmers to put into practical operation the plans discussed at the meetings.

EXHIBITS AT FAIRS

For three years the Department of Farmers' Institutes and Demonstrations has been preparing and furnishing for county fairs a very complete exhibit relating to agriculture and home economics, the exhibit consisting of from fourteen to sixteen large boxes containing charts, photographs and other illustrative material, illustrating important agricultural experiments and important agricultural and economic information.

PUBLICATIONS

Since definite subjects are selected for each year's institute work, with a view to bringing about a certain unanimity of action, it seems appropriate that some of these subjects be treated more at length, be published in pamphlet form, and then be mailed to all institute members. These pamphlets were first issued as special numbers of *The Industrialist*, but later, under the name of *Agricultural Education*, this publication was entered in the post office as a regular periodical. There is a membership fee in all institutes; all members receive free from four to six or more numbers of the periodical during each year. A large edition of each number is printed, and back numbers are mailed to new members until the supply is exhausted.

Institute Pamphlets Issued.—1907-'08: *Swine, Farm Dairying, Poultry, Sheep, Dry Land Farming, Hay Making, Demonstration Methods.* 1908-'09: *Plant Breeding, Insects Injurious to Farm Crops, Some Wheat Problems.* 1909-'10: *Orcharding, The Silo.* 1910-'11: *Highway Improvement, Economic Value of Bird Life, Swine Problems, Crop Exhibits.* 1911-'12: *The Cement Silo, Farm Drainage, Yards and Lawns, Improving Farm Pastures.* 1912: *Sorghums.*

Highway Engineering and Irrigation

W. S. GEARHART, State Highway Engineer.
H. B. WALKER, Drainage and Irrigation.
A. R. LOSH, Assistant Engineer.
FRED R. HESSER, Assistant Engineer.

HIGHWAY ENGINEERING

It is eminently proper that the Agricultural College should maintain a trained highway engineer who is primarily the State adviser for county and city officials on matters relating to roads and bridges. He makes plans and specifications for bridges and culverts and advises as to their location. He examines proposed highway improvements, and, if it is desired, makes plans and specifications for such road work, whether the improvement contemplates the use of macadam, oil, or sand-clay, or is simply to be an improved earth road. Later, if desired, he will inspect all bridge and road work on its completion and report its condition to the proper county or city officials. All such work is done without charge to the local community, other than for actual traveling expenses. When other work will permit, he also advises bridge contractors, and furnishes plans, specifications, etc., on the same terms as to officials, except that the contractor will be charged the actual cost of a draftsman's time in drawing the plans.

DRAINAGE AND IRRIGATION ENGINEERING.

It has been found by careful investigation, that there are more than twenty counties in eastern Kansas where large areas of valuable land are in great need of systematic tile drainage. In October, 1910, the Agricultural College employed, and is now maintaining, a public drainage engineer whose duties are outlined much as are the duties of others connected with this department—attending farmers' institutes from October to March, and from March to October advising with farmers, county surveyors, and engineers, relative to the best and most economical plans of straightening creeks and rivers, and draining fields and farms, and of developing plants for farm irrigation. To this engineer are assigned all problems relating to farm irrigation. His services are absolutely free other than the usual charge for traveling and local expenses.

Home Economics

FRANCES L. BROWN.
MARY E. SIMMONS.
FLORENCE SNELL.
ADAH LEWIS.

While thousands of young women have had residence instruction in domestic science at the Agricultural College, there are still many other thousands who have been unable to take advantage of the excellent facilities which the College possesses in this field. Therefore, the Division of College Extension employs four competent teachers and demonstrators in this subject, to carry instruction in home economics to these absent

ones. These teachers attend farmers' institutes for the regular institute period of five months, hold "movable schools" for three months, and then hold "women's meetings," and attend teachers' institutes, chautauquas, grange meetings, women's club meetings, etc., the rest of the year. At all times an extensive correspondence is carried on with the women and girls of the State. "Girls' Home Economics Clubs" are also organized in high schools and in rural neighborhoods, using regular cooking and sewing lessons sent out from the department. Correspondence with women's clubs is also invited relative to occasional lessons in cookery, for which printed lessons are sent on request.

MOVABLE SCHOOLS IN HOME ECONOMICS

The College is able to reach a limited number of persons by means of its actual class and laboratory work. The institute program reaches many more with its system of lectures and addresses. In addition, the movable schools in home economics, giving definite courses of instruction which occupy at one place a period of one week, enable the College to carry its educational services directly to the homes of the people. These schools continue during a single week, from 1:15 P. M., Monday, to 11:45 A. M., Saturday. The sessions of the schools of economics are conducted according to the following program: Cookery, from 9 to 11:45; sewing, from 1:15 to 3:45; "round table" for the public, from 4 to 5. For a course to be organized, it should have not less than twenty and not more than forty members. A fee of one dollar a member is paid to the local committee for the purchase of supplies, and for the entertainment of the two College teachers who conduct the class. No visitors are permitted until after the conclusion of the day's work, at 3:45 P. M. The sessions of the schools are held in the months of March, April, May, and September.

GIRLS' HOME ECONOMICS CLUBS

The College is able to give personal instruction in home economics each year to only about eight hundred girls; through the "movable schools" it is not likely that more than five hundred women and girls can be reached annually with the limited instruction that can be given by the present force of teachers during the periods of one week each; through the farmers' institutes and women's institutes, not more than five thousand women are likely to receive the information that can be given in the more or less formal discussions; through correspondence courses it is not probable that more than a few hundred persons will be reached. The College is, therefore, undertaking in addition the work of organizing hundreds of "girls' home economics clubs" in town and village high schools, and in rural communities. A certificate is granted to a club having six charter members, although better results are likely to follow from a larger membership. Printed lessons in cooking and sewing are supplied by the secretary of the club, together with blanks for reports, which are to be handed in after each lesson. Literature relating to the work being conducted is sent by the College to the individual members of the clubs. In a limited way this is a form of correspondence-study, and girls can to a certain extent be prepared for either the regular correspondence courses, for domestic science work in high school or college, or for their usual

home duties. The work also prepares the way for the regular teaching of domestic science and art in the high schools of the State. It is hoped that it may be arranged for a College representative to visit these clubs annually. A small charge, to be paid the College, is required of each club organized under the College auspices.

Correspondence Study

H. L. KENT, Secretary Agricultural and Academic Courses.
GEO. E. BRAY, Mechanic Arts Courses.

The Kansas State Agricultural College offers to the men and boys and the women and girls of Kansas an opportunity to study agriculture, home economics, mechanic arts, and farm engineering at home, alone, or in groups, believing that it is as much a part of the province of the institution to offer such instructions to those who can not attend the College class as it is to offer instruction to those who are able to undertake studies at the College. Opportunity is therefore offered for systematic study by correspondence in many subjects which have a direct bearing upon the problems of the farm and the home.

Three lines of work are offered for the purpose of helping those who have only limited time to study on any particular subject, but who need help, and then more extended courses for those who have more time. An opportunity is also offered for those who wish to study with the idea of securing college credit.

FOR WHOM INTENDED

The correspondence courses here outlined should be of especial interest to the following classes of persons:

- (1) Boys and girls who have completed the common-school course of study, but who can not immediately attend a high school or other preparatory school.
- (2) Young men and women who feel that their school days are over, but who have aspirations, not yet satisfied, for a better education.
- (3) Men and women of middle life who wish to know more of the sciences of the farm and of the home.
- (4) Men who have been farming along general lines, but who have developed an interest in some special kind of work, such as orcharding or dairying, and who wish to direct their attention chiefly to that field.
- (5) Road supervisors who need to know more of the science of road making, the building of culverts, etc., but who can not afford to stop their work and take a special course.
- (6) Men and women who have passed middle life, who are about to retire from active farming, but who intend to keep their minds young by study, and who desire to enrich their own experience by adding to what they themselves have gained a knowledge of what has been discovered by others.
- (7) Capitalists and business men who are holding investments in lands, and who should know how to make those investments increase in value.

(8) Teachers who desire to teach agriculture or home economics in special classes, or who wish to learn how to enrich their teaching in the sciences.

Only a small percentage of the farming population of Kansas is able to attend the classes in the Agricultural College; in all, about 100,000 people attend the farmers' institutes; a few hundred attend the movable schools. There still remain nearly a million adult people living in the country, few of whom have ever read carefully a single book on farm crops, dairying, horticulture, farm drainage, or the like. The College is now prepared to offer correspondence courses in the following subjects:

READING COURSES

Alfalfa.	Injurious Insects, Orchard.
Beef Production.	Orcharding.
Breeds of Cattle.	Potato Growing.
Breeds of Horses.	Poultry Disease Prevention.
Breeds of Sheep and Swine.	Poultry Feeding and Housing.
Canning and Preserving.	Rural Hygiene.
Care of Children.	Sanitation and Health.
Corn.	Sheep Feeding.
Dry Land Farming.	Sheep Raising.
Farm Dairying.	Silos and Silage.
Hog Raising.	Soils.
Home Decoration.	Sorghum Crops.
Household Bacteriology.	Stock Feeding.
Incubating and Brooding.	Study of Child Life.
Injurious Insects, Field.	Tree Planting.
Injurious Insects, Garden.	

EXTENSION COURSES

Animal Breeding.	Gasoline and Kerosene Traction Engines.
Automobiles.	Highway Construction.
Blacksmithing.	Home Nursing.
Carpentry and Building.	Home Sanitation.
Civics.	Household Management.
Concrete Construction.	Insects Injurious to Farm Crops.
Cookery.	Insects Injurious to Orchard Crops.
Dairy Manufacturing.	Landscape Gardening.
Elementary Architectural Drawing.	Machine Shop Work.
Elementary Woodworking.	Pattern Making.
Farm Blacksmithing.	Plumbing.
Farm Builders.	Sewing.
Farm Dairying.	Shop Mechanical Drawing.
Farm Drainage.	Shop Mathematics.
Farm Machinery.	Soils.
Farm Mechanics.	Steam Boilers and Engines.
Farm Woodworking.	Steam Traction Engines.
Foundry Practice.	Stock Feeding.
Gasoline Engines.	

COURSES GIVING COLLEGE CREDIT

Algebra.	Geometry, Solid.
Ancient History.	History of Education.
Animal Breeding.	Manual Training Drawing.
Elementary Agriculture.	Medieval History.
English Classics.	Methods of Teaching.
English Readings.	Modern History.
Evolution of Domestic Animals.	Philosophy of Education.
Farm Crops.	Poultry Management.
Floriculture.	Projection Drawing.
Forage Crops III.	Rural Sociology.
Forestry, Farm.	School Law and Management.
Fruit Growing.	Sociology.
Geology.	The American Nation.
Geometrical Drawing.	Vegetable Gardening.
Geometry, Plane.	Vocational Education.

Student Organizations

STUDENT COUNCIL

The student council is a representative body which was organized by the students in 1909 and received official sanction from the Board of Regents and the Faculty of the College. Its objects are: "(1) To act as a representative body before the governing officers of the College in all matters that concern the individual students, student organizations, or the student body as a whole; (2) to act as a body of mediation between different student organizations or enterprises whenever such service is sought by such organizations or enterprises; (3) to take cognizance of all matters that pertain to the good name and scholarship of the student body, to the end that high standards of honor on the campus and elsewhere may be maintained."

This student council consists of four members elected from the senior class, three from the junior, two from the sophomore, and one from the freshman class. In addition, the subfreshman class elects a delegate, who has the privilege of speaking on subjects pertaining to his class, but has no vote. At each meeting of the council a committee of the College Faculty may also be present to participate in the discussions. The members of the council are elected each term, but at each election at least two of the representatives of the senior class and one of those of the junior class must be reelected.

The student council occupies an interesting and valuable place in the College life, and as a whole may be said to be an unqualified success in establishing a system of representative government among the students touching affairs peculiarly their own, and also in matters involving the Faculty. All acts of the council are submitted to the President of the College, and if they concern the rules, regulations, or ordinances of the College, are subject to approval by the proper governing body. The council is especially helpful in maintaining a high standard of honor among the students in both individual and organized relations. As a means of securing a better understanding in matters likely to cause friction between the student body and the Faculty, the council performs a most important function.

THE CHRISTIAN ASSOCIATIONS

The Young Men's Christian Association and the Young Women's Christian Association are organizations of the greatest worth and value in the College community, forming centers of moral culture and religious stimulus among the young men and women during their developmental period. As is well known, the Christian associations in colleges stand for the best ideals among the students, and are always accorded the cordial

support of the authorities. In addition to general moral and spiritual development, the College Christian associations are of practical and efficient influence among the students in many directions. Membership in these associations is limited to persons connected with Protestant evangelical churches, but others are admitted as associate members.

THE YOUNG MEN'S CHRISTIAN ASSOCIATION.

The College Y. M. C. A. has always been a strong and influential body among the students. Its growth may be indicated by the fact that the organization was able in 1908 to erect a handsome building for its purposes at a cost of \$35,000, on the corner of Eleventh and Fremont streets, near the College grounds.

This building contains reading rooms, eighteen students' living rooms, a dining hall, and a gymnasium 42 x 70 feet, provided with lockers, baths, etc. The building with its conveniences is open free to all students, although a small fee of five dollars a year is charged for the use of the gymnasium and baths. One of the useful and practical features of the Y. M. C. A. is a students' employment bureau, which is maintained for the benefit of all students seeking employment. The religious work of the organization includes various courses for the study of the Bible and the work of Christian missions, which are maintained through the winter. The regular religious meetings of the association occur on Thursday evenings from 6:45 to 7:30, while occasional Sunday afternoon meetings are also held. Special meetings and receptions, which serve to broaden the acquaintanceship of the students and promote good-fellowship, are arranged from time to time. Especial attention is given the new students on and after their arrival, and assistance is rendered in securing rooms and boarding places for them. The association maintains a regular secretary, with whom prospective students are cordially encouraged to correspond. Address, General Secretary, Y. M. C. A., Kansas State Agricultural College, Manhattan, Kan.

YOUNG WOMEN'S CHRISTIAN ASSOCIATION

Similar in aim and purpose to the organization of the young men is the Young Women's Christian Association. The Y. W. C. A. home, at 905 Fremont street, is the permanent headquarters of the association, to which all young women of the College are at all times heartily welcome. An office for the secretary and a girls' rest room are also maintained during the College year on the first floor, southwest corner, of the Domestic Science and Art Building. The rooms at the College are open to visitors at any hour of the day and are attractively furnished with conveniences for rest and study.

At the association home, informal gatherings and entertainments lend variety and cheer to the life of the young women members and their friends.

An employment bureau for women students is maintained by the general secretary, without charge to its beneficiaries. Various committees are responsible for the lines of work of the association. One of the most practical of these is the investigation of cases of illness among the College girls, and the rendering of assistance when necessary. At the

beginning of the College terms the incoming trains are met by a committee of girls wearing purple bows, by means of which they may easily be recognized. This committee engages in assisting new women students in securing suitable lodging and boarding places.

During the College year various social functions are held for the benefit of the College women. The first of these is an informal reception, held on the first Friday following the opening of College, in order to enable the College girls to become better acquainted with one another. Once each year, in the winter term, the two associations entertain jointly.

The religious life of the Young Women's Association is fostered by weekly religious meetings, by courses in the study of the Bible and in special Sunday services, for which outside speakers are often obtained. Courses for the study of mission work are also conducted.

LITERARY AND SCIENTIFIC SOCIETIES

The literary societies of the College, eight in number, are wholly students' organizations, holding weekly meetings in the College buildings. The Alpha Beta and the Franklin societies are open to both sexes; the Ionian, Eurodelphian, and Browning societies admit only young women to membership, while the Webster, Hamilton, and Athenian societies admit young men only. Students are encouraged to join one of these organizations for the sake of practice in the use of language, training in debate, and general experience in conducting meetings and in dealing with their fellows. These societies jointly maintain a debating council which coöperates with a Faculty committee in arranging for all inter-collegiate and interstate debates participated in by representatives of the College. The oratorical board, similarly maintained by these societies, arranges for the intersociety and intercollegiate oratorical contests.

THE SCIENCE CLUB

This is an organization of instructors and students for the promotion and advancement of science at the College. Membership is open to all persons interested in science. The meetings are held on the first Monday evening of each month in the lecture room of the Department of Chemistry in Physical Science Hall. All papers given at these meetings represent original work in science done at the institution. The program is further characterized by free discussion of the papers presented and by general scientific notes and news contributed by the members.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS

This national organization of electrical engineers has a College branch, which holds its meetings on the first Tuesday evening of each month in the rooms of the Department of Electrical Engineering on the first floor of Physical Science Hall. At these meetings, papers and discussions of professional interest are presented. Membership is confined to instructors and students in electrical engineering.

THE AGRICULTURAL ASSOCIATION

The Agricultural Association, composed of students especially interested in agricultural progress, holds meetings every two weeks, on Monday evening, in Fairchild Hall. This organization has steadily in-

creased in numbers and interest until it is a potent and progressive factor in spreading the gospel of agricultural betterment.

THE CADET CORPS

Under the provisions of the Morrill act of 1862, under which the College was founded, instruction in military science and tactics is obligatory. Military science and drill are required of all men students in the freshman and sophomore years. This body of young men is formed into a cadet corps, organized into two battalions of infantry, under the command of a United States regular army officer in active service, temporarily detailed to this duty. The cadet corps is officered by upper classmen and constitutes a body under excellent discipline and training, and of attractive military bearing.

The uniforms are of the West Point pattern, and the insignia of rank are those of the United States infantry. The uniform is required to be worn while on military duty by all students subject to the drill regulations, and by reason of its neat appearance and serviceable character it is also quite frequently used by the under classmen for daily wear. Military discipline and training for a short time in a student's life has undoubtedly value in creating habits of obedience, neatness, and precision, and in the development of an *esprit de corps*.

THE COLLEGE BAND

The College band is a military organization, composed of cadets assigned to this duty for the College year in lieu of drill and technical military instruction. The band is limited in its membership, and attendance of the members upon its exercises is obligatory. It has proved an effective aid to the cadet corps, stimulating a love for martial music, and affording an attractive feature of the various public ceremonial occasions at the College.

THE COLLEGE ORCHESTRA

The orchestra is a student organization connected with the Department of Music, membership in which is voluntary. Its daily training under competent leadership results in the acquisition of a considerable repertoire of musical compositions of the best quality. Those connected with the orchestra obtain in this way familiarity with the works of many of the great composers, and among the students at large the orchestra is an efficient aid in cultivating a taste for and an appreciation of good music.

ATHLETIC ORGANIZATIONS

By means of the new gymnasium the College is now prepared to give complete physical as well as mental training. This building, which is equipped with all the usual accessories, assists in developing and maintaining physical tone and health in the student body. In addition to the gymnasium classes, and physical training in the military corps of cadets, all young men are encouraged to develop their physical skill by playing on practice teams in various athletic lines. In the fall, football teams are organized; in the fall and winter basket ball; while in the spring baseball, tennis, and track athletics prevail. Every possible encouragement is given all students desirous of participating in these games to enter the

practice teams and receive the necessary instruction. The most proficient of these have opportunity to enter the first teams and participate in intercollegiate contests. The College authorities encourage all reasonable and sane athletic development, as a means for the training of physical qualities desirable in men everywhere. Professionalizing tendencies are strictly repressed, and the athletic rules adopted by the Faculty prevent, by proper regulation, all participation in intercollegiate games on the part of students deficient in their studies.

The women students have equal opportunity for general physical training with the young men. In the gymnasium, under a physical director, they receive training suitable to their needs. Basket ball and tennis teams are organized among the young women.

List of Students

GRADUATES

CANDIDATES FOR MASTER'S DEGREE, 1913

Michael Francis Ahearn, B. S. '04
(Massachusetts Agricultural College), *Horticulture, Botany.*
Manhattan, Riley county.

Ivan Arch Moorhead, B. S. '12 *Chemistry, Soils.*
Manhattan, Riley county.

Charles Myszka, B. S. '11 *Soils.*
Garnett, Anderson county.

August Levi Nelson, B. S. '11 (Utah
Agricultural College) *Agronomy.*
Sandy, Utah.

IN COURSE LEADING TO MASTER'S DEGREE

Nellie Aberle, B. S. '12 *English, Psychology.*
Manhattan, Riley county.

Harrison Broberg, B. S. '11 *Civil Engineering.*
Manhattan, Riley county.

Joseph Henry Coffman, B. S. '11 *Bacteriology.*
Manhattan, Riley county.

Jane Mary Dow, B. S. '11 *English Literature, English
Language.*
Manhattan, Riley county.

Edwin Henry Hungerford, B. S. '12 *Chemistry, Bacteriology.*
Manhattan, Riley county.

Catherine Laura Justin, B. S. '12 *Home Economics, History.*
Manhattan, Riley county.

Margaret Justin, B. S. '09 *History, English.*
Manhattan, Riley county.

Venus Kimble, B. S. '08 *English, Psychology, Music.*
Manhattan, Riley county.

Walter Jacob King, B. S. '09 *Engineering.*
Enterprise, Dickinson county.

Myra May Munger, B. S. '12 *Domestic Art, Music, English.*
Manhattan, Riley county.

Don Bion Whelan, A. B. '10 (Hillsdale
College) *Entomology, Zoölogy.*
Hallett, Michigan.

Louis Coleman Williams, B. S. '12 *Horticulture, Botany, Ento-
mology.*
Manhattan, Riley county.

Albert Franklin Yeager, B. S. '12 *Botany, Entomology.*
Bazaar, Chase county.

IN ADVANCED COURSE NOT LEADING TO A DEGREE

Justina Marinda Andrews, B. S. '12 *Domestic Science, English, Ped-
agogy.*
Decatur, Decatur county.

Ethel Leota Bales, B. S. '12 *Domestic Science, Music, Soci-
ology.*
Manhattan, Riley county.

Meta Evaline Buck, B. S. '12 *Domestic Science, Music, Peda-
gogy, Sociology.*
Manhattan, Riley county.

Edith Ellen Coffman, B. S. '06 *Domestic Art, Sociology.*
Manhattan, Riley county.

Harry Lewis Cole, B. S. '12 *Chemistry.*
Manhattan, Riley county.

John Ralph Cooper, B. S. '12 *Horticulture.*
Lincoln, Nebraska.

Perry Van Ewing, B. S. '11 (Ohio State
University) *Zoölogy, Animal Husbandry.*
Manhattan, Riley county.

Clemens Inks Felps, B. S. '12 *Civil Engineering.*
Manhattan, Riley county.

Carlotta Marks Ford, A. B. '11 (Univer-
sity of Illinois) *Experimental Milling.*
Manhattan, Riley county.

Forrest Faye Frazier, B. S. '10 (Ohio
State University) *Mechanical Engineering.*
Manhattan, Riley county.

Gilbert Ghormley, B. S. '10 *Mathematics, Pedagogy.*
Sterling, Rice county.

Elizabeth Hassebroek, B. S. '09 *Music.*
Manhattan, Riley county.

Leslie Eugene Hazen, B. S. '06 *Mathematics.*
Centralia, Nemaha county.

Ida Viola Hepler, B. S. '10 *Domestic Science, German, Em-
bryology.*
Manhattan, Riley county.

Hazel Juanita Hoke, B. S. '12 *Pedagogy, Sociology, Domestic
Art, Music.*
Manhattan, Riley county.

(Mrs.) Emma Knostman Huse, B. S. '80, *Industrial Journalism.*
Manhattan, Riley county.

Edna May Jones, B. S. '10 *Sociology, Pedagogy, Music.*
Manhattan, Riley county.

Frank Donald McClure, B. S. '11 *Sociology, Pedagogy.*
Blue Mound, Linn County.

James Walker McColloch, B. S. '12 *Agronomy, Entomology.*
Anthony, Harper county.

Ethel McDonald, B. S. '07 *Home Economics, Pedagogy,
Music.*
Manhattan, Riley county.

Edmund Charles Magill, B. S. '12 *Horticulture, Pathology.*
Wichita, Sedgwick county.

Charles Ernest Millar, B. S. '09
(University of Illinois) *Agronomy, Animal Husbandry.*
Manhattan, Riley county.

Hope Olive Palmer, B. S. '10 *German.*
Arkansas City, Cowley county.

Margaret Rodgers, B. S. '12 *History, Domestic Art.*
Manhattan, Riley county.

Essie Blanche Schneider, B. S. '12 *History, English, Domestic Art,
Sociology.*
Manhattan, Riley county.

Minnie Magdalene Scott, B. S. '11 *History, Sociology, Domestic
Science, Music.*
Manhattan, Riley county.

Charles Warren Shull, B. S. '97 *Agronomy, Dairying.*
Wallace, Wallace county.

Jay Latimer Smith, B. S. '08 *Agronomy.*
Manhattan, Riley county.

Ned Smith, B. S. '12 *Chemistry, English, Pedagogy.*
Manhattan, Riley county.

William Timothy Stratton, A. B. '08
(University of Indiana) *Mechanics.*
Manhattan, Riley county.

Duncan Stuart, B. S. '98 (University of
Vermont) *Dairying.*
Manhattan, Riley county.

Virginia Troutman, B. S. '07 *Entomology, Zoölogy, Horticulture, Sociology.*
Comiskey, Lyon county.

Blanche Vanderlip, B. S. '10 *Pedagogy, Sociology, Domestic Science.*
Woodston, Rooks county.

Eva Bernice Welch, B. S. '12 (University of Missouri) *Music.*
Stanberry, Missouri.

Harrison Walter Wilkison, B. S. '11 *Engineering, Sociology.*
Dwight, Morris county.

Anna Waller Williams, A. M. '12
(University of Illinois) *Experimental Milling.*
Manhattan, Riley county.

Esther Steinhoff Wilson, B. S. '10 *History, Music.*
Manhattan, Riley county.

Susan Elizabeth Wingfield, B. S. '12 *Pedagogy, German.*
Dwight (Geary county).

SENIORS

AGRONOMY

Name.	Post office and county (or state)
Raymond Albert Baldwin,	Atchison, Atchison
Robert Lewis Barnum,	Simpson, Cloud
Alonzo Pearl Beaman,	Macksville, (Pratt)
John Augustus Billings,	Grantville, Jefferson
Frank Scott Blair,	Blue Rapids, Marshall
Robert Kline Bonnett,	Howard, Elk
Glenn Buckman,	Conway, McPherson
Robert Proffitt Campbell,	Attica, Harper
Lewis Cae Christie,	Manhattan, Riley
Charles Ambrose Davis,	Clay Center, Clay
Victor Vincil Dryden,	Larned, Pawnee
John Hamilton Gill,	Manhattan, Riley
William Albert Hendershot,	Manhattan, Riley
William Raymond Jones,	Plains, Meade
George Henry Kellogg,	Manhattan, Riley
Clyde Ludington,	Manhattan, Riley
Arthur Hiram Montford,	Burrton, Harvey
William Alfred Moss,	Lincoln, Lincoln
Clare Sparks Newkirk,	Geneseo, Rice
Raymond Franklin Olinger,	Lafontaine, Wilson
Floyd Joe Robbins,	Manhattan, Riley
John Festus Shafer,	Manhattan, Riley
Ernest Hanna Smies,	Clifton, (Clay)
Ethel Nellie Vanderwilt,	Solomon, Dickinson

ANIMAL HUSBANDRY

Roy Austin Appleton,	Maple Hill, Wabaunsee
Levi Clifton Baker,	Fredonia, Wilson
Rufus Clyde Bohrer,	Cawker City, Mitchell
De Hellick Branson,	Winfield, Cowley
George Wiley Brown,	Ellsworth, Ellsworth
Russell Reuben Dodderidge,	White City, Morris
Benjamin Harrison Gilmore,	El Dorado, Butler
Walter Ellsworth Gilmore,	El Dorado, Butler
David Gray,	Topeka, Shawnee
Waldo Ernest Grimes,	Greenwood, Missouri
Gaylord Hancock,	Menlo, Thomas

SENIORS—CONTINUED

Name.	Post office and county (or state).
John Russell Hewitt,	Anthony, Harper
Jacob Claude Holmes,	Piedmont, Greenwood
Walter Hoover,	Canton, McPherson
George Burrel Kirkpatrick,	Eureka, Greenwood
Sam August Krehbiel,	Moundridge, McPherson
Perry Herbert Lambert,	Hiawatha, Brown
Dick Lewallen,	Manhattan, Riley
Henry Wilson McFadden,	Halls Summit, Coffey
Dennis Fleet Mossman,	Maple Hill, Wabaunsee
Elmer Barrett Myers,	Hutchinson, Reno
Albert Victor Norlin,	McCracken, Rush
Andrew Minnie Paterson,	Manhattan, Riley
Henry Claude Pettit,	Harrison, Arkansas
Henry James Plumb,	La Cygne, Linn
Neil Lewis Rucker,	Burdett, Pawnee
Richard Ollie Swanson,	Manhattan, Riley
Albert Dean Wise,	Clearwater, Sedgwick
Daniel Walter Ziegler,	Manhattan, Riley

DAIRY HUSBANDRY

Ralph Andrew Cooley,	Manhattan, Riley
Harry Elkins Dodge,	Salina, Saline
Elmer Oscar Graper,	El Dorado, Butler
Omer Ivo Oshel,	Gardner, Johnson

HORTICULTURE

John Fuller Davidson,	Wichita, Sedgwick
Fred Thomas Rees,	Grantville, Jefferson
Leonhardt Swingle,	Manhattan, Riley
John Alexander Vohringer,	Hutchinson, Reno

VETERINARY MEDICINE

Ray Robert Davis,	Cherryvale, Montgomery
William Clyde Drake,	Manhattan, Riley
John Harris,	Havensville, Pottawatomie
Leland Howell,	North Topeka, Shawnee
Harry Frank Hunt,	Manhattan, Riley
Joseph Irl Kirkpatrick,	Wichita, Sedgwick
Glenn Elmer Nelson,	Smith Center, Smith
Henry Herman Olsen,	Baker, Brown

ARCHITECTURE

Raymond Fink,	Formoso, Jewell
Arthur Bea Hungerford,	Manhattan, Riley
Ray Kerr,	Salina, Saline
Fay Elisha McCall,	Wa Keeney, Trego
Charles Marion Neiman,	White Water, Butler
Lynn Alan Robinson,	Atwood, Rawlins
Stanley Albert Smith,	Salina, Saline
Elsmere Joe Walters,	Manhattan, Riley
Miller Fulton Whittaker,	Oklahoma City, Oklahoma

CIVIL ENGINEERING

Max Erett Alderman,	Manhattan, Riley
Worth Gladstone Alderman,	Manhattan, Riley
Dudley Atkins, Jr.,	Manhattan, Riley
Charles Harrison Blake,	Ulysses, Grant
Ernest Friedrich Boettcher,	Winkler, Riley
Victor Guy Hendrickson,	Manhattan, Riley

SENIORS—CONTINUED

Name.	Post office and county (or state).
Irvin Vernard Howenstein,	Manhattan, Riley
Mulford Marion Hutchinson,	Manhattan, Riley
Joseph Clarence Jones,	Manhattan, Riley
James Arthur Nicolay,	Scranton, Osage
Leo Wayne Rexroad,	Darlow, Reno
Ralph Brunt Smith,	Manhattan, Riley
Ira Earl Taylor,	Manhattan, Riley
Jesse Wittmeyer,	Wichita, Sedgwick
Gerald Wyland,	Smith Center, Smith

ELECTRICAL ENGINEERING

Richard Nella Allen,	Topeka, Shawnee
George Austin Barnard,	Madison, Greenwood
Walter Albert Buck,	Manhattan, Riley
Aubrey Deakins Conrow,	Manhattan, Riley
Henry Huxley Fenton,	Manhattan, Riley
George Smith Gillespie,	Elk City, Montgomery
Frank Hill Graham,	Yates Center, Woodson
Carl Laurencious Ipsen,	Manhattan, Riley
William Gordon James,	Arkansas City, Cowley
Leslie Le Roy Jenson,	Winfield, Cowley
Charles Adelbert Leech,	Fort Scott, Bourbon
Frank Clark Lewis,	Paola, Miami
Virgil Emmitt Miller,	Manhattan, Riley
Frank Edward Moss,	Eureka, Greenwood
Howard Otto Parker,	Lyons, Rice
Clinton John Reed,	Manhattan, Riley
Elmer Guy Stahl,	Topeka, Shawnee
Virgil David Stone,	Winfield, Cowley
Charley Dayton Strain,	Phillipsburg, Phillips

MECHANICAL ENGINEERING

Robert Roy Baird,	Riley, Riley
William Clyde Baxter,	Thayer, Neosho
Lester Earl Grube,	Vermilion, Marshall
Theodore Arthur Hall,	Hope, Dickinson
Ernest Baker Keith,	Manhattan, Riley
Robert Ray Kimmel,	Wilsey, Morris
Roy Reno Myers,	Manhattan, Riley
Dale Morrison Perrill,	Manhattan, Riley
Elbridge Gale Sanders,	Manhattan, Riley
William Arthur Schuster,	Leavenworth, Leavenworth
Elmer Scheder,	Prescott, Linn
Reuben Edward Wiseman,	Manhattan, Riley
Joseph Roy Witmer,	Baileyville, Nemaha
John Henry Zimmerman,	Stilwell, Johnson

PRINTING.

Roy Ira Davis,	Plevna, Reno
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HOME ECONOMICS

Hattie Julia Abbott,	Manhattan, Riley
Elsie Adams,	Manhattan, Riley
Ruth Evangeline Allen,	Manhattan, Riley
May Maria Anderson,	Topeka, Shawnee
Elsie Kathryn Arbuthnot,	Cuba, Republic
Edith Florence Avery,	Wakefield, Clay
Hazel Anna Baker,	Peabody, Marion
Georgia Kilbourn Baldwin,	Manhattan, Riley

SENIORS—CONTINUED

Name.	Post office and county (or state).
Mildred Barr,	Salina, Saline
Amy Gertrude Batchelor,	Manhattan, Riley
(Mrs.) Mary K. La Mont Bolinger,	Manhattan, Riley
Hattie Amelia Burnham,	Wa Keeney, Trego
Georgia Lydia Canfield,	Belleville, Republic
(Mrs.) Ida R. Nonamaker Carlson,	Manhattan, Riley
Florence Janet Carvin,	Wichita, Sedgwick
Neva Helen Colville,	Wichita, Sedgwick
Lena Adelle Conrow,	Manhattan, Riley
Vida Mae Cowgill,	Long Island, Phillips
Jennie Lynn Cox,	Wichita, Sedgwick
Maud Rae Criger,	Howard, Elk
Ruby Belle Croxton,	Manhattan, Riley
Florence Olena Dale,	Lawrence, Douglas
Florence Lydia Deitz,	Greystone Heights, Wyandotte
Marguerite Dodd,	Manhattan, Riley
Myrtle Alberta Easley,	Salem, <i>Nebraska</i>
Florence Baker Embree,	Topeka, Shawnee
Mabel Louise Etzold,	Liberal, Seward
Laura Margaret Fate,	La Cygne, Linn
Irene Clara Fenton,	Junction City, Geary
Jennie Irene Flinn,	Admire, Lyon
Ivy Anna Fuller,	Manhattan, Riley
Edith Lois Givens,	Manhattan, Riley
Ethel Goheen,	Manhattan, Riley
Mabel Maye Gonterman,	Manhattan, Riley
Ella Ruth Graybill,	Sedgwick, Harvey
Ethel Theodora Grimes,	Greenwood, <i>Missouri</i>
Myrtle Grover,	Manhattan, Riley
Helen Haines,	Manhattan, Riley
Nettie Regina Hanson,	Concordia, Cloud
Nealie Annis Harbaugh,	Topeka, Shawnee
Olive Wentworth Hartwell,	Wichita, Sedgwick
Vera Ware Hawthorne,	Gypsum, Saline
Lynne Hilsabeck,	Manhattan, Riley
Celia Claire Hoaglin,	Manhattan, Riley
Lura Beatrice Houghton,	Manhattan, Riley
Margaret Anne Huston,	Manhattan, Riley
Elma Sage Jones,	Barrett, Marshall
Margaret Florence Jones,	Barrett, Marshall
Juanita Pauline Kempton,	Kincaid, Anderson
Minnie Luella King,	Lexington, Clark
Grace Matilda Kolterman,	Manhattan, Riley
Pearl Alice Kolterman,	Manhattan, Riley
Edna Ethlyn Lawton,	Americus, Lyon
Hazel Viola Limbocker,	Manhattan, Riley
Reva Elizabeth Lint,	Kansas City, Wyandotte
Annie Elizabeth Logan,	Maplehill, Wabaunsee
Gertrude Anna Lyman,	Manhattan, Riley
(Mrs.) Maude Eveline N. McColloch,	Osborne, Osborne
Ruth Barrett McLean,	Mankato, Jewell
Bertha Wilhelmina Mangelsdorf,	Atchison, Atchison
Epha Estella Mather,	Grinnell, Gove
Ethel Leota Michaels,	Osawatomie, Miami
(Mrs.) Myrtle Augusta B. Miller,	Manhattan, Riley
Helen Mattier Myers,	Manhattan, Riley
Josie Ellen Nicolay,	Scranton, Osage
Lucy Edna Nixon,	Eureka, Greenwood
Ida Mae Northrop,	Salina, Saline

SENIORS—CONTINUED

Name.	Post office and county (or state).
Ramona Louise Norton,	Kansas City, Wyandotte
Edith Baldwin Payne,	Wichita, Sedgwick
Gladys Mary Payne,	Emporia, Lyon
Melva Gay Perry,	Manhattan, Riley
Laura Victoria Peterson,	Manhattan, Riley
Ethelyn Pearl Pray,	Manhattan, Riley
Maggie Price,	Manhattan, Riley
Ina Frank Priest,	Manhattan, Riley
Helen Edna Rannells,	Manhattan, Riley
Enid Alzine Redden,	Gypsum, Saline
Christine Rentschler,	Manhattan, Riley
Addie Dorritt Root,	Wichita, Sedgwick
Ruth Lillian Rowland,	Kansas City, Wyandotte
Madge Catherine Rowley,	Fredonia, Wilson
Verna Mae Rumbel,	Moran, Allen
Anna Elizabeth Sanders,	Manhattan, Riley
Catheryn Mary Schiereck	Dighton, Lane
(Mrs.) Mary H. Love Schilling,	Hiawatha, Brown
Margaret Washburn Schultz,	Manhattan, Riley
Bertha Ruegg Schwab,	Clifton, Washington
Margherita Scott,	Arkansas City, Cowley
Lula Shelby,	Kansas City, Wyandotte
Josephine Edythe Skinner,	Manhattan, Riley
Susie Louise Smith,	Hutchinson, Reno
Vesta Smith,	Parsons, Labette
Clara Spaniol,	Plevna, Reno
Charlotte Louise Spier,	Salina, Saline
Twyliah Opal Springer,	Tulsa, Oklahoma
Lulu Elsie Stallman,	Hutchinson, Reno
Lyda Ruth Stoddard,	Horton, Brown
Olive Tennis,	Chanute, Neosho
Alice Edna Terrill,	Lawrence, Douglas
Ethel Turner,	Tonganoxie, Leavenworth
Katheryn Florence Van Noy,	Tribune, Greeley
Fern Vena Weaver,	Wakefield, Clay
Anita Bernice Weible,	Topeka, Shawnee
Blanche Westenhaver,	Manhattan, Riley
Lula Willis,	Horton, Brown
Matilda Jane Wilson,	Manhattan, Riley
Ada Worley,	Paradise, Russell
Ola Maud Young,	Beloit, Mitchell
Katharyn Pheobe Zipse,	Jewell, Jewell

GENERAL SCIENCE

Wilbur Lee Beauchamp,	Holton, Jackson
Lawrence Edward Brennan,	Maplehill, Wabaunsee
Lola Edna Brethour,	Green, (Riley)
Ida Alfreda Carlson,	Manhattan, Riley
Merle Dolin Collins,	Manhattan, Riley
Jesse Harrison Corsant,	Salina, Saline
Aubrey Elbert Davidson,	Manhattan, Riley
Harriet Ellen Dunn,	Manhattan, Riley
Emmett Keeler Emslie,	Manhattan, Riley
Anna Hattie Ericson,	Lindsborg, McPherson
Clyde Carney Hamilton,	Holton, Jackson
Marguerite Hartwig,	Goodland, Sherman
Will Patrick Hayes,	Manhattan, Riley
George Harrison Hower, Jr.,	Sylvan Grove, Lincoln
Louis Edgar Hutto,	Manhattan, Riley

SENIORS—CONCLUDED

Name.	Post office and county (or state).
George Washington Kolterman,	Manhattan, Riley
Thomas Archibald Leadley,	Rozel, Pawnee
Fred Herbert Loomis,	Alton, Osborne
John Lyons,	Bendena, Doniphan
Thomas Daniel Lyons,	Manhattan, Riley
Earl Waldo Martin,	Republic, Republic
Leroy David Moss,	Beloit, Mitchell
Zoe Franky Norman,	Oklahoma City, <i>Oklahoma</i>
Lester Boyd Pollom,	North Topeka, Shawnee
Martin William Souders,	Auburn, <i>Nebraska</i>
Earl Springer,	Highland, Doniphan
James West,	Scandia, Republic
Hannah Amelia Wetzig,	Manhattan, Riley
Bert Worden Whitlock,	Wichita, Sedgwick
Charles Clements Wolcott,	Garfield, Pawnee

INDUSTRIAL JOURNALISM

Lucile Rebecca Berry,	Jewell, Jewell
John Merton Palmer,	Jewell, Jewell

JUNIORS

AGRONOMY

Wilber Scott Acton,	Ames, Cloud
Aaron Edward Anderson,	Eskridge, Wabaunsee
Jay Andrews,	Bloom, Ford
John Otto Barnes,	Manhattan, Riley
Elmer Bird,	Great Bend, Barton
Harry Clay Bird,	Great Bend, Barton
Byron Ellsworth Blair,	Pratt, Pratt
Freeland Thomas Boise,	Kansas City, Wyandotte
John Walter Bolinger,	Bogue, Graham
Horace George Chittenden,	Hays, Ellis
Alfred Lester Clapp,	Yates Center, Woodson
Franklin Arthur Coffman,	Manhattan, Riley
Allen Park Davidson,	Manhattan, Riley
Ernest Doryland,	Manhattan, Riley
Frank Leroy Fleming,	Reading, Lyon
Clarence Griffing Frey,	Manhattan, Riley
Arthur Irving Gilkison,	Hutchinson, Reno
Hiram Standley Gish,	Manhattan, Riley
William Inglis Gray,	Jamestown, Cloud
Simpson Floyd Hacker,	Atwood, Rawlins
Ralph Sams Hawkins,	Marysville, Marshall
Herbert Lynne Hildwein,	Hiawatha, Brown
Archie Loy Hodgson,	Harveyville, Wabaunsee
Frank Robert Howe,	Wymore, <i>Nebraska</i>
Robert Earl Karper,	Manhattan, Riley
Harry Llewellyn Kent,	Manhattan, Riley
Charles Parke Lillard,	Bloomington, <i>Illinois</i>
John Howard Loomis,	Colby, Thomas
Milton Carl Lytle,	Wellsville, Franklin
Clayton Alexander McIntosh,	Washington, Washington
Preston Essex McNall,	Gaylord, Smith
Charles Homer McNamara,	Manhattan, Riley
George Denton Miller,	Horton, Brown
Paul Leroy Mize,	Wilder, Johnson
Leon Newton Moody,	Riley, Riley

JUNIORS—CONTINUED

Name.	Post office and county (or state).
Clark Mortimer Oursler,	Manhattan, Riley
Edward May Parrish,	Rosedale, Wyandotte
Charles Arthur Patterson,	Ford, Ford
Aaron Ernest Pearson,	Simpson, Mitchell
Stephen Lee Potter,	Marshall, Missouri
Frank Lee Robinson,	Atwood, Rawlins
Raymond Walter Schaefer,	Jewell, Jewell
Martin Ivin Shields,	Lost Springs, Marion
Arthur Unruh,	Pawnee Rock, Barton
George Crider Van Neste,	Lawrence, Douglas
Roy Harrison Van Scoik,	Aulne, Marion
Lawrence Paul Wehrle,	Scranton, Osage
Earl Willis,	Manhattan, Riley
William Wayne Willis,	Emporia, Lyon
Vard Thomas Worstell,	Manhattan, Riley

ANIMAL HUSBANDRY

Claude Arbuthnot,	Cuba, Republic
Lloyd Neil Arnold,	Hays City, Ellis
Harry Grant Avery,	Wakefield, Clay
Gilbert Lynn Cleland,	Manhattan, Riley
Fred Raymond Dunlap,	Eureka, Greenwood
Verne Oren Farnsworth,	North Topeka, Shawnee
Ward Stanley Gates,	Asherville, Mitchell
Lloyd Wright Gearhart,	Manhattan, Riley
Roy Elmer Gwin,	Morrowville, Washington
Walter Andrew Hepler,	Manhattan, Riley
Earl Henry Hostetler,	Manhattan, Riley
Evan Liston Jenkins,	White City, Morris
George De Rue Meiklejohn Jones,	Kansas City, Missouri
Romney Caryle Ketterman,	La Harpe, Allen
Archer Franklin Kiser,	Manhattan, Riley
Roy William Kiser,	Manhattan, Riley
Karl Knaus,	Benedict, Wilson
Frank Kramer,	Zeandale, Riley
David Frier Laubmann,	Russell, Russell
Carl Oscar Levine,	Marysville, Marshall
Clifford Meldrum,	Cedar Vale, Chautauqua
Claude Fred Neerman,	Cummings, Atchison
William O'Connell,	Kiowa, Barber
Frank Pletcher Root,	Iola, Allen
Herman Frederick Tagge,	Manhattan, Riley
Byron John Taylor,	Chapman, Dickinson
Leon Warden Taylor,	Chapman, Dickinson
Oliver Taylor,	Jefferson, Montgomery
Harry Millard Ziegler,	Iola, Allen

DAIRY HUSBANDRY

Harry Benjamin Allen,	Goff, Nemaha
William Dennis Brigham,	Burlington, Coffey
Ernest Herbert Clark,	Linn, Washington
William Downs Cusic,	Tecumseh, Shawnee
William Glenne Davis,	Clay Center, Clay
Arthur Doryland,	Manhattan, Riley
Cameron Schuyler Goldsmith,	Abilene, Dickinson
Cecil Wick Haines,	Manhattan, Riley
Ralph Hershey Musser,	Abilene, Dickinson
Roy Malcolm Phillips,	Manhattan, Riley
Harry Charles Stockwell,	Havensville, Pottawatomie

JUNIORS—CONTINUED**HORTICULTURE**

Name.	Post office and county (or state).
Lawrence William Anderson,	Lincoln, Lincoln
William Renwick Curry,	Dunavant, Jefferson
Ray Benjamin Ellis,	Pleasanton, Linn
Harold Clare Gaden,	Riley, Riley
Robert Benjamin Hood,	Hutchinson, Reno
Clarence Roy Jaccard,	Manhattan, Riley
James Donald McCallum,	Kansas City, Wyandotte
Ernest Grover Shaad,	Lawrence, Douglas
Thomas Garfield Spring,	Greensburg, Kiowa
William Leander Sweet,	Manhattan, Riley
Koshiro Ushiku,	Lawrence, Douglas
Horace Theodore Wilkie,	Topeka, Shawnee
Arthur McKee Young,	Manhattan, Riley

VETERINARY MEDICINE.

Hans William Broberg,	Lincoln, Lincoln
Ira Loren Fowler,	Manhattan, Riley
Jesse Johnathon Frey,	Manhattan, Riley
George Frederick Hass,	Baldwin, Douglas
Thomas Powell Haslam,	Manhattan, Riley
Lucian Eastman Hobbs,	Smith Center, Smith
Raymond Roger Houser,	Grainfield, Gove
Aldie Philip Immenschuh,	Manhattan, Riley
Ellis Wesley Kern,	Kirwin, Phillips
Edward Kernohan,	Nashville, Kingman
Gustav Herman Mydland,	Manhattan, Riley
Roscoe Damron Parrish,	Manhattan, Riley
Claude Raymond Riney,	Dodge City, Ford
Delos George Tepfer,	Wichita, Sedgwick
Tom Toothaker,	Manhattan, Riley
Richard Thomas Wilson,	Manhattan, Riley

ARCHITECTURE

Samuel Hiram Crottinger,	Bison, Rush
Asbury Endacott,	Clay Center, Clay
Harold Thomas English,	Hutchinson, Reno
Earl Philip Friedline,	Alden, Rice
Carl Olaus Johnson,	Frankfort, Marshall
Warren Arthur Rude,	Hoisington, Barton
Floyd Alonzo Smutz,	Bird City, Cheyenne
Russell Barr Williamson,	Princeton, Franklin

CIVIL ENGINEERING

George Wallace Alexander,	Atchison, Atchison
Arvid Anton Anderson,	Lindsborg, McPherson
Arthur Gilbert Beckman,	Lindsborg, McPherson
Willis Edwin Comfort,	Manhattan, Riley
Arthur Harold Gilles,	Rosedale, Wyandotte
John Gist,	Hutchinson, Reno
Melvin Earnest Hartzler,	Goodland, Sherman
Charles William Hickok,	Ulysses, Grant
George Barney Hickok,	Wichita, Sedgwick
Oscar Lee Humbert,	Silver Lake, Shawnee
John Selwyn McBride,	Mankato, Jewell
Ralph Denny Rhodes,	Manhattan, Riley
Benjamin Scalapino,	Everest, Brown
Charles Henry Scholer,	Milo, Lincoln
Winfield Wayne Scott,	Colony, Anderson

JUNIORS—CONTINUED

Name.	Post office and county (or state).
Ulysses Jay Smith,	Portis, Smith
Harold Ainsworth Thackrey,	Kansas City, Wyandotte
George Edwin Werner,	Linn, Washington

ELECTRICAL ENGINEERING

Vern Howard Brothers,	Agra, Phillips
Henry B. Brown,	Mont Ida, Anderson
Harry Everett Butcher,	Solomon, Dickinson
Nelson Harry Davis,	Delavan, Morris
Frank Cutler Ellis,	Manhattan, Riley
Shelby Glasgow Fell,	Haviland, Kiowa
Lawrence Vale Fickel,	Manhattan, Riley
Harold Goble,	Riley, Riley
Paul Edward Jackson,	Downs, Osborne
Walter William Keith,	Ottawa, Franklin
Peter Charles John Klaumann,	Belleville, Republic
John Barlow Lund,	Manhattan, Riley
Homer Earl Newhouse,	Lane, Franklin
Arthur Nichols,	Buffalo, Woodson
Louis Reynolds Parkerson,	Manhattan, Riley
Gilbert Haven Sechrist,	Meriden, Jefferson
Frank Sidorfsky,	Le Roy, Coffey
William Ross Smith,	Peabody, Marion
John Thompson Steele,	Manhattan, Riley

MECHANICAL ENGINEERING

George Bair,	Manhattan, Riley
Bruce Henry Cummings,	Richland, (Douglas)
George Gray,	Peabody, Marion
Noble Max Hutchinson,	Coalinga, California
William Albert Lathrop,	Manhattan, Riley
James Francis Moss,	Eureka, Greenwood
James Henry Nelson,	Ellsworth, Ellsworth
Herbert Roy Pierce,	Udall, Cowley
William Leon Rhoades,	Pleasanton, Linn
Robert Johnston Taylor,	Manhattan, Riley
Victor Whiteside,	Wichita, Sedgwick
Carl Walter Wyland,	Harlan, Smith
James Howard Young,	Kansas City, Wyandotte
Roy Norton Young,	Beloit, Mitchell

PRINTING

Athol George Vadakin,	Marion, Marion
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HOME ECONOMICS

Katherine Adams,	Manhattan, Riley
Harriet Ruth Aiman,	Manhattan, Riley
Lulu Emma Cina Albers,	Hargrave, Rush
Eva Alleman,	Kansas City, Wyandotte
Myra Amsden,	Manhattan, Riley
Eva Alice Armstrong,	Holton, Jackson
Madeline Baird,	Topeka, Shawnee
Ethel May Balmer,	Hiawatha, Brown
Margaret Anne Blanchard,	Manhattan, Riley
Ruth Leota Blevens,	Arkansas City, Cowley
Ruby Edna Blomquist,	Kansas City, Wyandotte
Esther Hulda Boell,	Riley, Riley
Ethel Marie Boyce,	Kansas City, Wyandotte
Mary Kathryn Boyle,	Chillicothe, Missouri

JUNIORS—CONTINUED

Name.	Post office and county (or state).
Ena Bess Brown,	Manhattan, Riley
Ethel Louise Brown,	Hutchinson, Reno
Jennie Helen Brown,	Plainsville, Rooks
Jessie Mabel Brown,	Ellsworth, Ellsworth
Minnie Ruth Brown,	Kansas City, Wyandotte
Elma Brubaker,	Edwardsville, Wyandotte
Dorothy Jo Buschow,	Colby, Thomas
Mary Alice Canfield,	Belleville, Republic
Cecyl De Lois Carter,	Lawrence, Douglas
Ethel Esther Cary,	Manhattan, Riley
Frances Mildred Caton,	Concordia, Cloud
Jennie Alberta Chappelle,	College Station, <i>Texas</i>
Ella Rebecca Chitty,	Manhattan, Riley
Ida Fra Clark,	Colony, Anderson
Mae Clark,	Eskridge, Wabaunsee
Edna Florence Coith,	Manhattan, Riley
Ona Bernice Comfort,	Manhattan, Riley
Anna Laura Cornick,	Anthony, Harper
Mary Margaret Courier,	Topeka, Shawnee
Elizabeth Anna Cox,	Goodrich, Linn
Grace Lucile Craven,	Manhattan, Riley
Pearl Artena Cross,	Wichita, Sedgwick
Carrie Ethel Cutter,	Ogden, Riley
Mary Dahl,	Montrose, Jewell
Nora Dahl,	Montrose, Jewell
Edna May Danner,	Topeka, Shawnee
Flossie Edyth Davis,	Plevna, Reno
Ethel Margaret Day,	Kansas City, Wyandotte
Josephine Woodward Doran,	Topeka, Shawnee
Mary Fay Elliott,	Dell Rapids, <i>South Dakota</i>
(Mrs.) Nellie Ferrin Ely,	Coldwater, Comanche
Mina Erickson,	Manhattan, Riley
Elsie May Ester,	Peck, Sedgwick
Helen Mary Evans,	Decatur, <i>Indiana</i>
Anna Judith Ferguson,	Mankato, Jewell
Edith Elizabeth Folz,	Marysville, Marshall
Lena Fossler,	Norcatur, Decatur
Velora Augusta Fry,	Manhattan, Riley
Olive Ruth Gage,	La Cygne, Linn
Grace Ethel Garvie,	Abilene, Dickinson
Ruth E. Gilbert,	Wichita, Sedgwick
Josephine Lura Gilmore,	Manhattan, Riley
Edith Sara Glasscock,	Kansas City, Wyandotte
Mabel Lucile Glenn,	Minneapolis, Ottawa
Alma Grace Halbower,	Anthony, Harper
Alta Marie Handlin,	Manhattan, Riley
Bessie Lourene Hardman,	Commerce, <i>Georgia</i>
Vida Agnes Harris,	Manhattan, Riley
Rembert Lydia Harshbarger,	Manhattan, Riley
Lola Garnett Hartwell,	Frankfort, Marshall
Nola Mae Hawthorne,	Gypsum, Saline
Mae Virginia Hildebrand,	Manhattan, Riley
Helen Marie Hockersmith,	Manhattan, Riley
Bessie Ursula Hoffman,	Enterprise, Dickinson
Mary Hoover,	Manhattan, Riley
Eva Hostetler,	Manhattan, Riley
Nora Melissa Hott,	Hiawatha, Brown
Ethel Margaret Hotte,	Manhattan, Riley
Lela Matilda Hough,	Wetmore, Nemaha

JUNIORS—CONTINUED

Name.	Post office and county (or state).
Jeanetta James,	Joplin, Missouri
Gladys May Johnson,	Manhattan, Riley
Mary Josephine Kimball,	Manhattan, Riley
Gladys Elsie Kirchner,	Burlingame, Osage
Alice Irene Kiser,	Manhattan, Riley
Vera Belle Kizer,	Manhattan, Riley
Mary Lemon,	Plainville, Rooks
Lillie Edna Lundberg,	Manhattan, Riley
Elvira Miriam McKee,	Manhattan, Riley
Iona McKeeman,	Manhattan, Riley
Sophia Elizabeth Maelzer,	Centralia, Nemaha
Anna Josifinia Carolinia Malm,	Manhattan, Riley
Stella Blanche Manley,	Topeka, Shawnee
Maud Marshall,	Dighton, Lane
Golda Estella Masters,	Manhattan, Riley
Edith Maude Maxwell,	Topeka, Shawnee
Gertrude Helen Miller,	Manhattan, Riley
Mildred Marie Mills,	Topeka, Shawnee
Emily June Milner,	Hartford, Lyon
Flora Seraphine Monroe,	Ottawa, Franklin
Margaret Ellenor Moore,	Manhattan, Riley
Jessie Elizabeth Neiman,	White Water, Butler
Mary Eleanor Neiman,	White Water, Butler
Prudence Eileen Neiswender,	North Topeka, Shawnee
Mary Eleanor Nichols,	Nortonville, Jefferson
Ethel Blanche Niver,	Inman, McPherson
Mary Nixon,	Manhattan, Riley
Genevieve Alice Nowlin,	Manhattan, Riley
Martha Lois Noyes,	Manhattan, Riley
Minnie Josephine O'Brien,	Kansas City, Wyandotte
Nellie Olson,	Harveyville, Wabaunsee
Lois Fae Paddock,	Manhattan, Riley
Mabel Grace Powell,	Manhattan, Riley
Anna Lottie Pratt,	Burlingame, Osage
Alta Coy Roberts,	Morrill, Brown
Ethel Bruce Roseberry,	Arkansas City, Cowley
Edna Winona Ross,	Burr Oak, Jewell
Mary Susan Rowan,	Arkansas City, Cowley
Grace Margaret Rupert,	Neodesha, Wilson
Clara Louise Sachau,	Manhattan, Riley
Amy Inez Savage,	Miltonvale, Cloud
Eda Lillian Schowalter,	Halstead, Harvey
Eva Leona Sharpe,	Chase, Rice
Bessie Laura Sheaff,	Kansas City, Wyandotte
Hazel Shellenberger,	Westboro, Missouri
Anna Maude Smith,	Lyons, Rice
Mary Kathryn Sterrenberg,	Manhattan, Riley
Lola Dow Stoddard,	Manhattan, Riley
Mary Dow Stoddard,	Manhattan, Riley
Julia Rena Strand,	Independence, Montgomery
Emma May Stratton,	Ottawa, Franklin
Murrel Myra Sweet,	Manhattan, Riley
Gail Tatman,	Manhattan, Riley
Lorena Belle Taylor,	Manhattan, Riley
Cora Tempero,	Clay Center, Clay
Emma Atwood Tomlinson,	Topeka, Shawnee
Bernice Truesdell,	Lyons, Rice
Bertha Truesdell,	Lyons, Rice
Aleatha Mae Tyner,	Overbrook, Osage

JUNIORS—CONCLUDED

Name.	Post office and county (or state).
Verna May Vanderlip,	Woodston, Rooks
Violet Vivian Vaniman,	McPherson, McPherson
Margaret Esther Walbridge,	Russell, Russell
Bessie Blanche Walsh,	Clay Center, Clay
Vera Glendolyn Warren,	Chanute, Neosho
Nellie Merle Wartenbee,	Liberal, Seward
Lillian Caroline Weeks,	Vermilion, Marshall
Amelia Ursula Wheeler,	Manhattan, Riley
(Mrs.) Lola Eleanor Whitelaw,	Cheney, Sedgwick
Margaret Lee Whitney,	Topeka, Shawnee
Gladys Wilcox,	Manhattan, Riley
Laura Wingfield,	Dwight, Geary
Beulah Wingfield,	Dwight, Geary
Bessie Margaret Young,	Manhattan, Riley

GENERAL SCIENCE

Jesse Bliss Adams,	Mound City, Linn
John Gordon Auld,	Manhattan, Riley
Harry Charles Baird,	Kensington, Smith
Albert William Bellomy,	Salina, Saline
Charles Fay Buck,	Oskaloosa, Jefferson
Lois Blanche Burt,	Wabaunsee, Wabaunsee
Leslie Irl Collins,	Manhattan, Riley
Clara Affadilla Deaver,	Sabetha, Nemaha
Henry Owen Dresser,	Manhattan, Riley
Mina Louise Dyer,	Riley, Riley
Weaver Glenn Hamilton,	Holton, Jackson
Thomas Joseph Harris,	Howard, Elk
Herbert Henley Haymaker,	Wichita, Sedgwick
Joseph Hopper,	Manhattan, Riley
Ruth Isabel Hughes,	Topeka, Shawnee
John Luther Hutchinson,	Lincoln, Lincoln
Ethel Marshall,	Dighton, Lane
William Joseph Marshall,	Dighton, Lane
Junior Bowler Mudge,	Manhattan, Riley
Kathrina Munger,	Manhattan, Riley
Minnie Beryl Pence,	Dunavant, Jefferson
George Hemrod Railsback,	Manhattan, Riley
Nellie Evelyn Reed,	Havensville, Pottawatomie
Leird Astor Richards,	Manhattan, Riley
John Lee Robinson,	Hays, Ellis
Joe Vale,	Webber, Jewell
Clyde George Winter,	Dover, Shawnee

INDUSTRIAL JOURNALISM

Vinton Detwiler,	Jewell, Jewell
Clifford Graham Mickel,	Soldier, Jackson
William Allison Sumner,	Manhattan, Riley

SOPHOMORES

AGRONOMY

Glenn Corson Allen,	Lawrence, Douglas
Glen Harry Anderson,	Lincoln, Lincoln
Alfred Carroll Apitz,	Manhattan, Riley
Victor Baer,	Hutchinson, Reno
William James Baker,	Malta Bend, Missouri
John Jasper Bayles,	Manhattan, Riley
Fred Miles Bealey,	Morrill, Brown

SOPHOMORES—CONTINUED

Name.	Post office and county (or state).
Lawrence Catlin,	Olathe, Johnson
Percy Walter Cockerill,	Manhattan, Riley
William Bayles Coffman,	Manhattan, Riley
Ralph Cleland Erskine,	Edgerton, Johnson
Robert Everett Freeto,	Cheney, Sedgwick
Charles William Gartrell,	Kansas City, Missouri
Benjamin Franklin Griffin,	Manhattan, Riley
Roy Hagans,	Utica, Ness
Frank Haucke,	Council Grove, Morris
John Vern Hepler,	Manhattan, Riley
Charles Franklin Holladay,	Spearville, Ford
John Dealy Hungerford,	Manhattan, Riley
James Laurence Jacobson,	Waterville, Marshall
Floyd William Johnson,	Downs, Osborne
Glenn Kepfield,	Topeka, Shawnee
Carl Richard Lawson,	Mankato, Jewell
Ernest Lawson,	Mankato, Jewell
Guy Everett McCarthy,	Manhattan, Riley
Walter Scott McCullough,	Solomon, Dickinson
Chester Howard Middleton,	Manhattan, Riley
Raymond Jack Montgomery,	Topeka, Shawnee
Thomas Edwin Moore,	Manhattan, Riley
Lawrence Mastin Nabours,	Manhattan, Riley
Edgar Allen O'Brien,	Luray, Russell
Edward Quimby Perry,	Manhattan, Riley
Joseph Heber Pierce,	Fredonia, Wilson
Richard Jerome Sedivy,	Blue Rapids, Marshall
Robert Edwin Sellers,	Emporia, Lyon
Herman Henry Sherrard,	Winfield, Cowley
Wilbur Neilsen Skourup,	Colony, Anderson
Elbert Edward Thompson,	Horton, Brown
Julius Patterson Van Vleit,	Manhattan, Riley
George Isidore Walsh,	Manhattan, Riley
John Hanna Welsh,	Kansas City, Missouri
George Washington Williams,	Bigelow, (Pottawatomie)
Roy Montgomery Winfrey,	Buckner, Missouri
John Barton Wise,	Clearwater, Sedgwick
Willits Reeve Worthington,	Manhattan, Riley

ANIMAL HUSBANDRY

George Harold Ansdell,	Jamestown, Cloud
Keatley Graham Baker,	Quanah, Texas
George Herbert Bunnel,	Iola, Allen
Arthur Burkholder,	Marion, Marion
Henry Samuel Collins,	Fort Worth, Texas
Hugh Byron Dudley,	Kansas City, Wyandotte
Harold Clay Ewers,	Topeka, Shawnee
Hugh Melvin Fellows,	Kansas City, Missouri
Hilder Forsberg,	Manhattan, Riley
Joe Myron Goodwin,	Asherville, Mitchell
Merrill Lenord Gould,	Jamestown, Cloud
Findley Enos Hartzler,	Goodland, Sherman
Howard Hayes,	Olathe, Johnson
Otto Lincoln Hubp,	Mexico City, Mexico
Oscar Le Roy Johnson,	Mead, Nebraska
Frederick Anthony Kays,	Eureka, Greenwood
Jefferson Kubin,	McPherson, McPherson
Fred Morris Layton,	Blue Rapids, Marshall
Paul Loomis,	Manhattan, Riley

SOPHOMORES—CONTINUED

Name.	Post office and county (or state).
Harry Strawn Loyd,	Wichita, Sedgwick
Jay Lawrence Lush,	Altamont, Labette
Arthur Erskine McClymonds,	Walton, Harvey
Lewis Evermont McGinnis,	Kansas City, Missouri
Clinton Fisk McIlrath,	Kingman, Kingman
Lorenzo Beckley Mann,	Hastings, Nebraska
William Symington Morrow,	Kansas City, Wyandotte
Earl O'Connell,	Kiowa, Barber
Raymond Smith Orr,	Manhattan, Riley
Raymond Leonadus Prather,	Tonovay, Greenwood
Barney Gayle Sims,	Edgerton, Johnson
William Burton Smith,	Wellsville, Franklin
Fred Martin Taylor,	Formoso, Jewell
Ralph Waldo Taylor,	Sedgwick, Harvey
Erwin Mildon Tiffany,	Lyndon, Osage
Walter Edward Tudor,	Holton, Jackson
Harry Homer Wilson,	Silver Lake, Shawnee
Wilmer Homer Wilson,	Osage City, Osage

DAIRY HUSBANDRY

Floyd Carl Cragg,	Manhattan, Riley
Ray Carroll Ennefer,	Pleasanton, Linn
Howard Allen Lindsley,	Arcadia, Crawford
James Walton Linn,	Manhattan, Riley
Victor Fred Stuewe,	Alma, Wabaunsee
Graydon Tilbury,	Arkansas City, Cowley
Francis Marion Wadley,	Braymer, Missouri

HORTICULTURE

Albert William Aicher,	Manhattan, Riley
Fred Collins Browne,	Burdett, Pawnee
Anson Lane Ford,	Geneva, Illinois
Harry Alexander Gunning,	Kansas City, Wyandotte
Basil Clement Hertslet,	Manhattan, Riley
Louie Lorraine Horr,	Lawrence, Douglas
Glenn Henderson Lawyer,	Iola, Allen
James Ralph Little,	Topeka, Shawnee
Archie Lee Marble,	Esbon, Jewell
Edgar Ralph Moseley,	Niagara Falls, New York
Alfred Nelson,	Paola, Miami
James Curtis Riney,	Pratt, Pratt
David Riley Shull,	Kansas City, Wyandotte
Walter Harris Washington,	Austin, Texas

VETERINARY MEDICINE

Merrill Ellsworth Agnew,	Smith Center, Smith
William Albert Bright,	Plainville, Rooks
Otis Raymond Burkett,	Wetmore, Nemaha
Laurence Vernon Cummings,	Wichita, Sedgwick
George Holland Dean,	Arkansas City, Cowley
Asa Forrest Flanagan,	Chapman, Dickinson
Earl Grove,	Arkansas City, Cowley
William Arthur Hagan,	Manhattan, Riley
William Clarence McConnell,	Downs, Osborne
Zara Harmon McDonnell,	Goff, Nemaha
John William Meyer,	Chapman, Dickinson
William James Scanlan,	Chapman, Dickinson

SOPHOMORES—CONTINUED

ARCHITECTURE

Name.	Post office and county (or state).
George Wilson Christie,	Manhattan, Riley
Irving Steward Clay,	Kansas City, Wyandotte
Roy Brett Froman,	Winfield, Cowley
Fred Alex Evans,	Arkansas City, Cowley
Robert Roy Green,	Uniontown, Bourbon
Carl Otto Hawkinson,	Marquette, McPherson
Harold Lester Hurtt,	Wichita, Sedgwick
Adelbert Dudley Little,	Manhattan, Riley
George Washington Packer,	Kansas City, Wyandotte
Elmer Housey Schultz,	Manhattan, Riley
Charles William Shaver,	Lincoln, Lincoln
Leo Leslie Smith,	Hoisington, Barton
Elmer Warren Wilson,	Turner, Wyandotte

CIVIL ENGINEERING

Harry Orvas Ashley,	Yates Center, Woodson
Luther Dudley,	Independence, Montgomery
Frank Harmon Freeto,	Cheney, Sedgwick
Forrest Everette Gilmore,	Manhattan, Riley
George Arthur Hopp,	Manhattan, Riley
Harry Ralph Johnston,	Manhattan, Riley
Ralph Jones,	Cottonwood Falls, Chase
Reuben Edward Lofinck,	Manhattan, Riley
Guy Allegre Russell,	Lakin, Kearny
William Warren Rutter,	Topeka, Shawnee
Francis Lewelling Shull,	Manhattan, Riley
Ralph Pierce Van Zile,	Manhattan, Riley
Albert Mun Yim,	Honolulu, Hawaii

ELECTRICAL ENGINEERING

James Edgar Alsop,	Wakefield, Clay
Benjamin McKinley Andrews,	Norcatur, Decatur
Chancellor Lee Archer,	Glasco, Cloud,
Ralph Gahan Baker,	Malta Bend, Missouri
Joel Emanuel Bengston,	Lindsborg, McPherson
Paul Houston Clark,	Pratt, Pratt
Charles Chadwick Coleman,	Oneida, Nemaha
George Louis Farmer,	Wichita, Sedgwick
Gerald Laurence Fitzgerald,	Colby, Thomas
Louis Charles Geisendorf,	Clearwater, Sedgwick
Maynard Goudy,	Waverly, Coffey
Paul Russell Helt,	Winfield, Cowley
Calvin Andrew Hooker,	Tyro, Montgomery
Ernest Willard Huston,	Clay Center, Clay
Paul Revier Lemley,	Ramona, Marion
Foo Yueu Lim,	Oxnard, California
Willard Jackson Loomis,	Colby, Thomas
Otto Irl Markham,	Wichita, Sedgwick
Frank Raymond Marshall,	Columbus, Cherokee
Perry Douglas Miller,	Garfield, Pawnee
Frank Archer Moore,	Tribune, Greeley
Milo Albert Nicholson,	Spring Hill, Johnson
Lawrence Archibald O'Brien,	Luray, Russell
Earl Rathbun Phares,	Parsons, Labette
Wayne Ramage,	Arkansas City, Cowley
Chester Arthur Reavis,	Havana, Montgomery
Solon Lycurgus Reeves,	Emporia, Lyon
Lloyd Reudy,	Dodge City, Ford

SOPHOMORES—CONTINUED

Name.	Post office and county (or state).
Paul Cotter Ringwalt,	Oakley, Logan
Lyle Bradford Robinson,	Manhattan, Riley
Corwin Crittenden Smith,	Dexter, <i>New Mexico</i>
Eugene Shapley Smith,	Pittsburg, Crawford
Claude Avery Stanton,	Clay Center, Clay
Henry Walter Stockebrand,	Vernon, Woodson
John William Stockebrand,	Vernon, Woodson
Claude Frederick Stone,	Smith Center, Smith
Leland Ray Varcoe,	Wilsey, Morris
Lyndell Porter Whitehead,	Walnut, Crawford

MECHANICAL ENGINEERING

Fenton France Borst,	Windom, <i>Minnesota</i>
Chester Arthur Carter,	Garden City, Finney
Lawrence Irvin Champe,	Greeley, Anderson
Paul Dryden,	Wichita, Sedgwick
Nicholas Fritz Enns,	Inman, McPherson
Albert Hilery Ganshird,	Manhattan, Riley
Charles Wallace Giffin,	Paola, Miami
George Hamilton,	Manhattan, Riley
Ralph Waldo Holland,	Pleasanton, Linn
William Warren Humble,	Sawyer, Pratt
William Grant Lay,	Topeka, Shawnee
Marc Atchison Lindsay,	Madison, Greenwood
George Mawhirter,	Wakarusa, Shawnee
John Irl Michaels,	Osawatomie, Miami
Eugene Willis Owens,	Kansas City, Wyandotte
John Dwight Parsons,	Arkansas City, Cowley
Horace Everett Pateman,	Leavenworth, Leavenworth
Archie Monroe Richards,	Manhattan, Riley
Wallace Larkin Rynerson,	Tecumseh, Shawnee
Ralph Allen Shelly,	Atchison, Atchison
Erle Hazlett Smith,	Kansas City, Wyandotte
Lisle Smith,	Pittsburg, Crawford
Roscoe Noyes St. John,	Rocky Ford, <i>Colorado</i>
Francis Eugene Sullivan,	Greeley, Anderson
Roy Leander Swenson,	Lindsborg, McPherson
Frank Vincent,	Kansas City, Wyandotte
Harold Adlia Wagner,	Manhattan, Riley
Leslie Adam Wilsey,	Chapman, Dickinson

PRINTING

Ross Eluer Busenbark,	Lyndon, Osage
Harry Coxen,	Manhattan, Riley
Thomas Stephen James,	Riley, Riley
Matthew Jones,	Lyndon, Osage
Joseph Glen Phinney,	Riverside, <i>California</i>

HOME ECONOMICS

Mary Hite Alexander,	New Ulysses, Grant
Maurine Dorothy Allison,	McPherson, McPherson
Ruth Arbuthnot,	Belleville, Republic
Dulce Atkins,	Manhattan, Riley
Florence Annie Baker,	Kansas City, Wyandotte
Orlena Marguerite Baker,	Manhattan, Riley
Reina May Baldwin,	Manhattan, Riley
Edna Frances Barber,	Gooding, <i>Idaho</i>
Grace Adeline Barker,	Newton, Harvey
Lillian Elsie Barnum,	Simpson, Cloud

SOPHOMORES—CONTINUED

Name.	Post office and county (or state).
Edith Nell Beaubien,	Dodge City, Ford
Mabel Bennett,	Manhattan, Riley
Irma Gwendolyn Bettis,	Blanket, <i>Texas</i>
Clara Louise Blair,	Mulvane, Sumner
Dorothy Blazer,	Wichita, Sedgwick
Myrtle Pearl Blythe,	White City, Morris
Grace Ruth Boulden,	Pratt, Pratt
Bertha Jane Boyd,	Spearville, Ford
Marie Anita Boyle,	Spivey, Kingman
Grace Edythe Brennan,	Maplehill, Wabaunsee
Amy May Briggs,	Sedgwick, Harvey
Florence Irene Broughton,	Clay Center, Clay
Elsie Bryan,	Wichita, Sedgwick
Elsie Luella Buchheim,	Winkler, Riley
Eliza Burkdoll,	Ottawa, Franklin
Frances Elizabeth Carl,	Long Island, Phillips
Florence Beatrice Caton,	Foxboro, <i>Massachusetts</i>
Eunice Hazel Catton,	Stafford, Stafford
Mary Rosena Churchward,	Wichita, Sedgwick
Pauline Frances Clarke,	Paola, Miami
Helen Louise Cooper,	Pendennis, Lane
Minerva Clare Cooper,	Manhattan, Riley
Nellie Martin Craig,	Osage City, Osage
Verral Janice Craven,	Erie, Neosho
Grace Lydia Currie,	Manhattan, Riley
Juanita Davis,	Cottonwood Falls, Chase
Wilma Louise Davis,	Manhattan, Riley
Myrtle De Fever,	Fall River, Greenwood
Elizabeth Dempewolf,	Frankfort, Marshall
Mabel Edwina Dickerson,	Springfield, <i>Missouri</i>
Mary Virginia Dodd,	Langdon, Reno
Alice Maude Douglas,	Topeka, Shawnee
Valeda Edith Downing,	Stafford, Stafford
Lola Eugene Drake,	Manhattan, Riley
Marguerite, Elliot,	Manhattan, Riley
Edith Gertrude Evans,	Manhattan, Riley
Emma Evaline Evans,	Liberal, Seward
Nellie Marion Evans,	Manhattan, Riley
Laura Belle Falkenrich,	Manhattan, Riley
Elizabeth Fitzgerald,	Roswell, <i>New Mexico</i>
Nelle Flinn,	Admire, Lyon
Esther Elizabeth Fowler,	Winfield, Cowley
Marion Rosina Fowler,	Brookville, Saline
Erma Lea Fox,	Larned, Pawnee
Grace Frisch,	Kansas City, Wyandotte
Margaret Elizabeth Fuller,	Topeka, Shawnee
Carrie Belle Gardner,	Newton, Harvey
Anna Lillie Gish,	Manhattan, Riley
Mary Ellen Glenn,	Waverly, Coffey
Grace Goldring,	Longford, Clay
Grace Mildred Goodell,	Tecumseh, Shawnee
Blanche Mamie Gorrell,	Wa Keeney, Trego
Amy Pearl Gould,	Manhattan, Riley
Leona Sanders Graves,	Inman, McPherson
Louise Greenman,	Kansas City, Wyandotte
Gladys Greenwood,	Hill City, Graham
Edythe Seanert Groome,	Manhattan, Riley
Minnie Agnes Gugenan,	May Day, Riley
Mary Gurnea,	Belleville, Republic

SOPHOMORES—CONTINUED

Name.	Post office and county (or state).
Daisy Arminta Hall,	Speed, Phillips
Drusilla Edith Halleck,	Abilene, Dickinson
Esther Jane Hammerli,	Oak Hill, Clay
Carrie Miller Harper,	Wichita, Sedgwick
Elsie Elnora Hart,	Edgar, Nebraska
Florence May Hayes,	Olathe, Johnson
Margaret Elizabeth Heath,	Junction City, Geary
Ethel Heinbaugh,	Parsons, Labette
Velma Matilda Helfinstine,	Smith Center, Smith
Alta Sarah Hepler,	Manhattan, Riley
Vivian Herron,	Topeka, Shawnee
Ruth Lucile Hill,	Wichita, Sedgwick
Esther Grace Hole,	Manhattan, Riley
Helen Marguerite Hornaday,	Lawrence, Douglas
Meda Flora Howell,	North Topeka, Shawnee
Louise Jacobs,	Council Grove, Morris
Elsie Alice Jones,	Monroeville, Allen
Grace Florence Kasermann,	Topeka, Shawnee
Crystal Helene Kelley,	Yates Center, Woodson
Mabel Beatrice Kessler,	Wichita, Sedgwick
Ida Jane Kingan,	Topeka, Shawnee
Katharine Mermet Laing,	Manhattan, Riley
Ruth Irene Landes,	Yates Center, Woodson
Mabel Lorraine Leuszler,	Linn, Washington
Nelle Florence Longenecker,	Kansas City, Wyandotte
Mary Isabel Love,	Holton, Jackson
Reah Jeannetta Lynch,	Clayton, Missouri
Esther Grace Lyon,	Manhattan, Riley
Grace Lyons,	Manhattan, Riley
Mayme Emma McCluskey,	Junction City, Geary
Grace Kerns McCoppin,	Phillipsburg, Phillips
Pearle Irene McHenry,	Paola, Miami
Mary Elizabeth McNamara,	Manhattan, Riley
Hazel May Maggs,	Chase, Gray
Mary Inez Mann,	Wichita, Sedgwick
Madeline Marshall,	Clifton, Washington
Mary Ruth Marshall,	Severy, Greenwood
Lucile Maughlin,	Sylvia, Reno
Hazel Alsesta Merillat,	Enterprise, Dickinson
Bodie Eleanor Mickelson,	Lyndon, Osage
Cecil Elizabeth Miller,	Hoisington, Barton
Lora Anna Miller,	Hoisington, Barton
Ella Mae Miltner,	Wichita, Sedgwick
Alice Montgomery,	Wilsey, Morris
Esther Mary Moore,	Purcell, Oklahoma
Edith Mildred Morse,	Abilene, Dickinson
Helen Morse,	Chico, California
Mabel Alice Moyer,	Manhattan, Riley
Helen Munger,	Carbondale, Osage
Winifred Louise Neusbaum,	Manhattan, Riley
Alma Dale Newell,	Americus, Lyons
Ethel Elverna Newkirk,	Geneseo, Rice
Ruth Sabina Nygren,	Topeka, Shawnee
Cleda May Pace,	Osawatomie, Miami
Susan Rufina Paddock,	Blue Mound, Linn
Gertrude Emeline Palmer,	Hays, Ellis
Pauline Parkhurst,	Kinsley, Edwards
(Mrs.) Eleanor Beverly Patrick,	Roswell, New Mexico
Mary Esther Peak,	Pratt, Pratt

SOPHOMORES—CONTINUED

Name.	Post office and county (or state).
Eva Mae Pease,	Manhattan, Riley
Hazel Berdella Peck,	Manhattan, Riley
Grace May Pershing,	Ogallah, Trego
Thurza Elizabeth Pitman,	Manhattan, Riley
Izil Isabelle Polson,	Fredonia, Wilson
Nellie Pope,	Hoxie, Sheridan
Evelyn Marie Potter,	Barnes, Washington
Etta Fay Reid,	Elmont, Shawnee
Esther Katharine Richards,	Manhattan, Riley
Sara Bunitta Richardson,	Kansas City, Wyandotte
Clara Louise Robbins,	Colony, Anderson
Georgia Emma Roberts,	Morrill, Brown
Helen Dena Robinson,	Holton, Jackson
Minnie Mayer Rosenthal,	Jamesport, Missouri
Elizabeth Jeanette Rothweiler,	Bison, Rush
Florence Cathryn Rothweiler,	Bison, Rush
Marie Rudnick,	Chicago, Illinois
Hazel Etta Russell,	Wichita, Sedgwick
Dorothy Schloh,	Natoma, Osborne
Verna Jane Schumacher,	Marysville, Marshall
Mary Logan Scott,	Parsons, Labette
Anna Winifred Searl,	Morland, Graham
Meta Viola Sheaff,	Kansas City, Wyandotte
Jennie Ellen Shoup,	Udall, (Sumner)
Mary Esther Slaughter,	Topeka, Shawnee
Luella Smith,	Pratt, Pratt
Lois Katharine Stewart,	Spearville, Ford
Rita Stinson,	Sylvan Grove, Lincoln
Edna Isabel St. John,	Wamego, Pottawatomie
Hazel Belle St. John,	Rocky Ford, Colorado
Marie Story,	Manhattan, Riley
Kate Carter Stratton,	Kansas City, Wyandotte
Frieda Matilda Stuewe,	Alma, Wabaunsee
Viola Maude Sweet,	Mankato, Jewell
Blanche Lovina Tanner,	Manhattan, Riley
Anna Elizabeth Thomas,	Kansas City, Missouri
Genevra Thompson,	Edgar, Nebraska
Gertrude Tillotson,	Manhattan, Riley
Mildred Tolles,	Lawrence, Douglas
Alberlina Tulloss,	Ottawa, Franklin
Mary Edith Updegraff,	Topeka, Shawnee
Nellie Maude Vedder,	Franklin, Franklin
Louise Chester Walbridge,	Russell, Russell
Mary Winona Ward,	Topeka, Shawnee
Claudia Belle Wells,	Barnes, Washington
Leona White,	Beloit, Mitchell
Vera Isabelle Whitmore,	Manhattan, Riley
Clara Willis,	Horton, Brown
Eugenie Williston,	Lawrence, Douglas
Bernice Elena Wilson,	Concordia, Cloud
Gertrude Allen Wilson,	Kansas City, Missouri
Julia Elizabeth Wolcott,	Manhattan, Riley
Gertrude Wunder,	Valley Falls, Jefferson
Esther Louise Zeininger,	Wichita, Sedgwick
Grace Helen Ziegler,	Junction City, Geary

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Vernon Everett Bundy,	Randolph, Riley

SOPHOMORES—CONCLUDED

Name.	Post office and county (or state).
Herbert Spencer Coith,	Greenleaf, <i>Washington</i>
James Denison Colt,	Manhattan, <i>Riley</i>
Granville Dorman,	Paola, <i>Miami</i>
Samuel Maurice Faidley,	Manhattan, <i>Riley</i>
Edna Gulick,	Winfield, <i>Cowley</i>
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Charles Axtell Hunter,	Blue Rapids, <i>Marshall</i>
Garnet Leona Hutto,	Manhattan, <i>Riley</i>
Orin Lee Isaacs,	Peabody, <i>Marion</i>
Mary Alberta Johnson,	El Dorado, <i>Butler</i>
Eddell Charles Jones,	Iola, <i>Allen</i>
Marguerite Eva Kell,	Manhattan, <i>Riley</i>
May Belle Landis,	Kiowa, <i>Barber</i>
Phoebe Jane Lund,	Manhattan, <i>Riley</i>
Fred Weymouth Milner,	Hartford, <i>Lyon</i>
Dale Johnson Missimer,	Manhattan, <i>Riley</i>
Edgar Leon Noel,	Glasco, <i>Cloud</i>
Harold Edward Rose,	Manhattan, <i>Riley</i>
Frank Sargent,	Holton, <i>Jackson</i>
Hattie Christina Schaumburg,	La Crosse, <i>Rush</i>
Orliff Elmer Smith,	Manhattan, <i>Riley</i>
Walter Francis Smith,	Mankato, <i>Jewell</i>
Charles Herbert Stacy,	Manhattan, <i>Riley</i>
Fred Stevenson,	Salina, <i>Saline</i>
Howard Oscar Wagner,	Manhattan, <i>Riley</i>
Ina Belle Wilson,	Wichita, <i>Sedgwick</i>
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Kyle George Coffman,	Topeka, <i>Shawnee</i>
Noel Everett Coleman,	Denison, <i>Jackson</i>

FRESHMEN—CONTINUED

Name.	Post office and county (or state).
Grafton Ellis Conway,	Lathrop, Missouri
William Ronald Cotton,	Wamego, Pottawatomie
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Charles Glen Hale,	Joplin, Missouri
John Earl Hammond,	Newton, Harvey
Albert Cecil Hancock,	Stanley, Johnson
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Frank Wilson Howard,	Oakley, Logan
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Fred Kindley,	Downs, Osborne
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Glenn Charles Salisbury,	Hays, Ellis
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Guy Cephus Smith,	Great Bend, Barton
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FRESHMEN—CONTINUED

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Ralph Robinold St. John,	Wamego, Pottawatomie
Harlan Randolph Sumner,	Manhattan, Riley
William Algernon Sutton,	Carthage, Missouri
Lewis Marten Umberger,	Hymer, Chase
Archie Glenn Van Horn,	Overbrook, Osage
Reuben Samuel Vilander,	Manhattan, Riley
Price Harlan Wheeler,	Garden City, Finney
Charles Edgar White,	Caney, Montgomery
Wilton Terry White,	Jewell, Jewell
Martin William Wilson,	Lincoln, Lincoln

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Bernard Martin Anderson,	Manhattan, Riley
James Malcolm Aye,	Manhattan, Riley
Hugh Edwin Baird,	Formoso, Jewell
Henry Bengman Bayer,	Toronto, Woodson
Orie Walter Beeler,	Mankato, Jewell
John Burnard Collister,	Manhattan, Riley
Lewie Elven Crandall,	Le Roy, Coffey
Fred Cromer,	Manhattan, Riley
Howard Conwell Edwards,	Jewell, Jewell
Frank Arthur Elliott,	Yates Center, Woodson
Henry Wallis Ewing,	Iola, Allen
Frank Burton Hodgden,	Manhattan, Riley
Louis Samuel Hodgson,	Harveyville, Wabaunsee
Clarence Blythe Howe,	Garrison, Pottawatomie
John Herbert Howell,	Waverly, Coffey
Louis Verne Jones,	Mulvane, Sedgwick
Benjamin Linton,	Mayetta, Jackson
Thomas Robert Logan,	Manhattan, Riley
Gerald Scott McNamara,	Manhattan, Riley
Lester William McNamara,	Manhattan, Riley
John Arthur Meyer,	Anthony, Harper
Walter John Ott,	Greenleaf, Washington
Wesley Parry,	Barclay, Osage
James Leroy Robinson,	Nashville, Kingman
William Herbert Robinson,	Holton, Jackson
Earl Franklin Shaw,	Phillipsburg, Phillips
Charles Lorn Slentz,	Great Bend, Barton
Philip Hopkins Sproat,	Topeka, Shawnee
Wayne Lycurgus Willhoit,	Manhattan, Riley
Lewis Arthur Williams,	Sylvan Grove, Lincoln

DAIRY HUSBANDRY

Earl Edward Davis,	Manhattan, Riley
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McGinnis Humphrey,	Ashland, Kentucky
Lee William Jeffrey,	Erie, Neosho
Robert Hezekiah Kidd,	Dayton, Ohio
Everett Raymond McGalliard,	Troy, Doniphan
Lowell Marston Mason,	Belle Plaine, Sumner
Kenneth Arthur Sandborn,	Blue Rapids, Marshall
Bert Shackelton,	Erie, Neosho
James Homer Sharpe,	Council Grove, Morris
Alva Frank Sheldon,	Lyons, Rice

FRESHMEN—CONTINUED

Name.	Post office and county (or state)
Elbert Lewis Smith,	Soldier, Jackson
Jay Webster Stratton,	Kansas City, Wyandotte
Rudolph Emel Stuewe,	Alma, Wabaunsee
William Fuller Taylor,	<i>Mexico City, Mexico</i>
Harold Elliot Thomas,	Pratt, Pratt,
Frank Andrew Unruh,	Haddam, Washington
Sidney Rendall Vandenberg,	Kansas City, Missouri
Edmund Francis Wilson,	Kansas City, Missouri

VETERINARY MEDICINE

Richard Clay Chatman,	Manhattan, Riley
Cleothorn Edward Cory,	Talmo, Republic
Earl Morris Dobbs,	Berkeley, California
Cecil Elder,	Argonia, Sumner
Gerald Woodward Fitzgerald,	Roswell, New Mexico
Paul King,	Potwin, Butler
Samuel Fleming Lipton,	Hoxie, Sheridan
Samuel Robert McArthur,	Walton, Harvey
Clair Foster Markley,	Belle Plaine, Sumner
Charles Ernest O'Neal,	Wiggins, Mississippi
Eugene Frank Pile,	Arkalon, Seward
George Thomas Reaugh,	Burns, Marion
Cameron Mae Smith,	Wakefield, Clay

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Roy Kenneth Cline,	Auburn, Nebraska
Alvin Theodore Coith,	Manhattan, Riley
William Richard Cristler,	Edgerton, Johnson
Donald Brown Ewing,	Manhattan, Riley
George Campbell Ferrier,	Osborne, Osborne
Bode Arthur Florman,	Marquette, McPherson
Otto Githens,	Republic, Republic
Thomas Lewis Holley, Jr.,	San Antonio, Texas
Charles Henry Kellogg,	Manhattan, Riley
Fred Albert Korsmeier,	Kansas City, Missouri

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George Shearer Douglass,	Beattie, Marshall
Edgar Goldsmith,	Cheney, Sedgwick
Oliver Donald Hatch,	Netawaka, Jackson
George Herren,	Manhattan, Riley
George Noel Herron,	Kansas City, Wyandotte
Joseph Irwin Jacques,	Manhattan, Riley
Elmer Johnson,	Cheney, Sedgwick
Shone Yue Lay,	Eskridge, Wabaunsee
Lawrence Antone Leonard,	Wamego, Pottawatomie
Henry Dall Linscott,	Milford, Geary
Aubert Jackson Mowray,	Lucerne, Sheridan
Charles Sappin,	Brooklyn, New York
Paul Crowder Scheer,	Council Grove, Morris
Richard Lewis Schovee,	North Topeka, Shawnee
Arthur Antella Sewell,	Kansas City, Wyandotte
Elmer Lee Shumaker,	Mount Pleasant, Iowa
Chalmers Stevenson,	Axtell, Marshall
Loipaid Carl Teeter,	Wamego, Pottawatomie
McKinley Wilbur Walls,	Beloit, Mitchell
Frank Elbert Whipple,	Manhattan, Riley

FRESHMEN—CONTINUED

ELECTRICAL ENGINEERING

Name.	Post office and county (or state).
George Carroll Bailey,	Bucklin, Ford
Charles Olin Ball,	Emmett, Pottawatomie
Edward Bond,	Cherokee, <i>Oklahoma</i>
Antis Monteville Butcher,	Solomon, Dickinson
George Andrew Cunningham,	Cheney, Sedgwick
Walter Emil Deal,	Great Bend, Barton
Fabian Caleb Dickinson,	Topeka, Shawnee
Francis Howard Dunlap,	Keats, Riley
Robert Alexander Franks,	Caney, Montgomery
Byron Eugene George,	Mankato, Jewell
Robert Albert Graves,	Abilene, Dickinson
James Sidney Hagan,	Manhattan, Riley
Charlie Thomas Halbert,	Agra, Phillips
Olley Harold Tamm,	Arkansas City, Cowley
Andrew Herold,	Seneca, Nemaha
William Kennedy Hervey,	Centralia, Nemaha
Arthur Edward Hopkins,	Tonganoxie, Leavenworth
Robert Lincoln Jennison,	Farnsworth, Lane
Arlie Noel Johnson,	Neosho Falls, Woodson
James William Kyle,	Abilene, Dickinson
James Dallas Laughlin,	Manhattan, Riley
Robert Bruce Leydig,	El Dorado, Butler
Arthur Wilford McCarter,	Topeka, Shawnee
William Charles McGraw,	Manhattan, Riley
Bruce Elmer McKee,	Lawrence, Douglas
Jay Meara,	Axtell, Marshall
John William Musil,	Blue Rapids, Marshall
Alvin Myers,	Valley Center, Sedgwick
Robert Earl Nixon,	Prairie View, Phillips
Edward John Otto,	Riley, Riley
Earl Vernie Plush,	Penalosa, Kingman
Marion Earl Rader,	Manhattan, Riley
John Prossor Rathbun,	Downs, Osborne
Paul Charles Rawson,	Wamego, Pottawatomie
Carl Matthias Reed,	Louisburg, Miami
Benjamin Burgess Richards,	Delphos, Ottawa
Oscar Rushing,	Altus, <i>Oklahoma</i>
John Paul Slade,	Clay Center, Clay
Dodderidge Calvin Tate,	Manhattan, Riley
Wood Tebbe,	Great Bend, Barton
Harry Tyrrell,	Topeka, Shawnee
Adolph Unruh,	Pawnee Rock, Barton
George Lin Usselman,	Coldwater, Comanche
Thomas Kenneth Vincent,	Kansas City, <imissouri< i=""></imissouri<>
Arnold Brown Walton,	Wichita, Sedgwick
Howell Weddle,	Solomon, Dickinson
Horace Alfred Williams,	Sylvan Grove, Lincoln
Joseph Evan Williams,	Sabetha, Nemaha

MECHANICAL ENGINEERING

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Albert Cecil Arnold,	Manhattan, Riley
Alfred Henry Barkemeyer,	Sedgwick, Harvey
Claude Franklin Blincoe,	Columbus, Cherokee
Charles Henry Bradley,	Sedan, Chautauqua
Clyde Raymond Colyer,	Belpre, Edwards
Karl Willard Dalrymple,	New Cambria, Saline
Ross Louis Hixon,	Manhattan, Riley

FRESHMEN—CONTINUED

Name.	Post office and county (or state).
Lester Carlton Howard,	Halford, Thomas
John Calvin Lois Kraeer,	Bartlesville, <i>Oklahoma</i>
Frank Clair Levengood,	Athol, Smith
Robert Francis Mirick,	Otis, Rush
Frank Richard Rawson,	Wamego, Pottawatomie
Lyman Jay Rees,	Talmage, Dickinson
George William Schneider,	Logan, Phillips
Foster Leonard Shelley,	Elmdale, Chase
Walter Alvin Simpson,	Manhattan, Riley
Diamond Richard Smith,	Lawrence, Douglas
Henry Richard Smith,	Hot Springs, <i>Arkansas</i>
Edward John Suydam,	Leavenworth, Leavenworth
Rees Conway Warren,	Manhattan, Riley
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Vester Wells,	Anthony, Harper
Franklin Wilson,	La Harpe, Allen
William Wyscarver,	Oakley, Logan
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Esther Bell,	Ackerland, Leavenworth
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Helen Elizabeth Bower,	Lincoln, Lincoln
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Anna Brandner,	Florence, Marion
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Margaret Isla Bruce,	Marquette, McPherson
Lou Sidney Burgess,	Russellville, <i>Arkansas</i>
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Louie Mabel Cadwell,	Ellsworth, Ellsworth
Hannah Margaret Campbell,	Attica, Harper
Clara May Christensen,	Argentine, Wyandotte
Verna Mae Coleman,	Little Rock, <i>Arkansas</i>
Martha Christabel Conrad,	Manhattan, Riley
Kathleen Lenore Conroy,	Manhattan, Riley
Grace Nancy Cool,	Glasco, Cloud
Marguerite Elizabeth Crans,	Eureka, Greenwood
Gladys Davies,	Concordia, Cloud
Mary Augusta Davies,	Green, Clay
Cora Ellen DeVault,	Ocheltree, Johnson
Florence Edith Dodd,	Langdon, Reno
Mae Ethel Doonan,	Kansas City, Wyandotte
Mary Rebecca Dunlap,	Eureka, Greenwood
Bernice Althea Eastman,	Lawrence, Douglas
Martha Fern Faubion,	Manhattan, Riley
Phebe Maria Cecilia Foberg,	Topeka, Shawnee
Anna Grace Fox,	Larned, Pawnee
Ruth Esther Frush,	Kansas City, Wyandotte
Dorethea Pearl Gish,	Manhattan, Riley
Elizabeth Emma Gish,	Manhattan, Riley

FRESHMEN—CONTINUED

Name.	Post office and county (or state).
Gladys Gist,	Manhattan, Riley
Mabel Edith Gough,	Chanute, Neosho
Roma Lillian Greene,	Newton, Harvey
Grace McKinley Greenwood,	Topeka, Shawnee
Josie Griffith,	Manhattan, Riley
Leota Lee Gromer,	Manhattan, Riley
Esther Gygax,	Osborne, Osborne
Elsie Lulu Hanger,	Corning, Nemaha
Hildegarde Elulia Harlan,	Manhattan, Riley
Verda Harris,	Manhattan, Riley
Edna Avis Hawkins,	Lincoln, Lincoln
Myra Elizabeth Hays,	Ottawa, Franklin
Nettie Hendrickson,	Manhattan, Riley
Marjorie Mayer Higley,	Cawker City, Mitchell
Bea Hoag,	Lebanon, Smith
Ruth Brandt Hoffman,	Newton, Harvey
Bertha Belle Hole,	Manhattan, Riley
Esther Lydia Hostetler,	Manhattan, Riley
Evelyn Humphreys,	Elmwood, <i>Illinois</i>
Mabel Marguerite Hunter,	Manhattan, Riley
Ruth Amelia Hutchings,	Manhattan, Riley
Leta Lucile Hutchinson,	Florence, Marion
Edith Brooks Inskeep,	Manhattan, Riley
Agnes McCord Irwin,	Manhattan, Riley
Pansy Mary Jackson,	Manhattan, Riley
Pearl LaClair Jacques,	Manhattan, Riley
Mamie Edith Johnson,	Alma, Wabaunsee
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Florence Justin,	Manhattan, Riley
Vera Elma King,	Milo, Lincoln
Fern Velma Koger,	Manhattan, Riley
Florence Elizabeth Jones,	Bendena, Doniphan
Lillian Antoinette Lathrop,	Manhattan, Riley
Bertha Blanche Lauger,	Manhattan, Riley
Eva Myrtle Lawson,	McPherson, McPherson
Anna Virginia Layton,	Blue Rapids, Marshall
Grace Isabel Luthye,	North Topeka, Shawnee
Mary Annette Lyon,	Manhattan, Riley
Vera Anna McCoy,	Imperial, <i>Nebraska</i>
Bessie McGraw,	Manhattan, Riley
Jennet McKee,	Richland, Shawnee
Ora May McMillen,	Topeka, Shawnee
Elsie Beth Marshall,	Clifton, Washington
Sarah Janet Marty,	Manhattan, Riley
Tressie Edna May,	Manhattan, Riley
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Clemma Olive Merryfield,	Minneapolis, Ottawa
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Margaret Gray Montgomery,	Cottonwood Falls, Chase
Helen Joyce Moore,	Manhattan, Riley
Mattie Marguerite Morrie,	Garnett, Anderson
Marie Moses,	Manhattan, Riley
Mary Rose Moss,	Eureka, Greenwood
Isabel Munroe,	Manhattan, Riley
Corinne Myers,	Marion, Marion
Vivian Neiswender,	North Topeka, Shawnee
Esther Serida Nelson,	Manhattan, Riley
Ala Anna Nesselrode,	Spring Hill, Johnson
Edna May Oetinger,	Alma, Wabaunsee

FRESHMEN—CONTINUED

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Ella Durlap Phenicie,	Tonganoxie, Leavenworth
Marie Pickrell,	Leon, Butler
Nellie Annette Pillsbury,	Manhattan, Riley
Helen Mitchell Pitcairn,	Concordia, Cloud
Cora Alberta Pitman,	Manhattan, Riley
Mary Elizabeth Polson,	Fredonia, Wilson
Mary Louise Price,	Winfield, <i>Iowa</i>
Gourney Augusta Prier,	Marion, Marion
Hermina Mealina Quantic,	Riley, Riley
Golda Lucile Rader,	Manhattan, Riley
Ruth Berneta Rathbone,	Manhattan, Riley
Juanita Reynolds,	Canton, McPherson
Cassie Katherine Richards,	Manhattan, Riley
Nannie Clytice Ross,	Burrton, Harvey
Grace Ethelynne Rudy,	Manhattan, Riley
Mabel Gertrude Ruggels,	Beverly, Lincoln
Jane Rosie Schimkowitsch,	Collyer, Trego
Pearl Eunice Schowalter,	Halstead, Harvey
Evelyn Schriver,	Halstead, Harvey
Gladys Shinn,	Russellville, <i>Arkansas</i>
Florence Hazel Smith,	Manhattan, Riley
Hazel Creola Spangler,	Manhattan, Riley
Esther Emily St. John,	Rocky Ford, <i>Colorado</i>
Kate Elizabeth Sumners,	Riley, Riley
Pearl Ellice Tackett,	Yates Center, Woodson
Emma Elizabeth Taylor,	Wichita, Sedgwick
Rhoda Ethel Tharp,	Hutchinson, Reno
Irene Venita Thompson,	Topeka, Shawnee
Eva Esther Townsend,	Nickerson, Reno
Wilma Irene Van Horn,	Overbrook, Osage
Irene Eleanor Walker,	Manhattan, Riley
Edith Mary Walsh,	Manhattan, Riley
Laura Augusta Westphal,	Manhattan, Riley
Mary Margaret Whalen,	Lincoln, Lincoln
Lottie Isabel Whitelaw,	Cheney, Sedgwick
Nettie Williams,	Marion, Marion
Grace Willits,	Topeka, Shawnee
Emily Thomas Wilson,	Manhattan, Riley
Ida May Wilson,	Manhattan, Riley
Irene Martha Wilson,	Turner, Wyandotte
Lois Emily Witham,	Manhattan, Riley
Vera Nan Woody,	Lincoln, Lincoln

GENERAL SCIENCE

Francis Waite Albro,	Manhattan, Riley
Edith Louise Alsop,	Wakefield, Clay
Edith Emma Arnold,	Manhattan, Riley
Wellington Tufts Brink,	Manhattan, Riley
Oliver Wendall Broberg,	Manhattan, Riley
Paul Alexander Cannady,	Yates Center, Woodson
Paul Adelbert Carnahan,	Manhattan, Riley
Wah Kai Chang,	Honolulu, <i>Hawaii</i>
Anton Christian Christophersen,	Garrison, Pottawatomie
Katherine Evelyn Daly,	Cherryvale, Montgomery
Thomas Elmore Dye,	Manhattan, Riley
John Burton Elliot,	Manhattan, Riley
Irl Ferris Fleming,	Manhattan, Riley
Samuel Ray Gardner,	Hartford, Lyon
Caroline Emma Greene,	Manhattan, Riley

FRESHMEN—CONCLUDED

Name.	Post office and county (or state).
Earl Edgar Hill,	Belleville, Republic
Ralph Parkinson Howell,	Morganville, Clay
Albert Ellis Hylton,	Manhattan, Riley
Myrtle Johnson,	El Dorado, Butler
Clarence Oliver Kimball, Jr.,	Manhattan, Riley
Ward Lobdell,	Great Bend, Barton
Albert Bruce Lovett,	Larned, Pawnee
Thomas Anderson McIntosh,	Edgerton, Johnson
Carl Ames McKibben,	Belpre, Edwards
Raymond Reed Neiswender,	Topeka, Shawnee
Earl Arthur Pearce,	Edgerton, Johnson
Merle Elliott Ranney,	Clyde, Cloud
Rudolph George Rodewald,	Yates Center, Woodson
James Walter Rolf,	Pratt, Pratt
Enoch Warren Roney,	Harper, Harper
Bertha Salter,	Manhattan, Riley
George Lie Van Siefkin,	Newton, Harvey
Emmett Warren Skinner,	Manhattan, Riley
James Albert Stinson,	Marquette, McPherson
Mary Louetta Taylor,	Manhattan, Riley
Arthur Walker,	Manhattan, Riley
Merl James Watson,	Clafin, Barton
Carmel Mae Wesley,	Great Bend, Barton
Cletus Jay Weygandt,	Keats, Riley
Rhea Chapman Winans,	Manhattan, Riley
Ahoon Wong,	Honolulu, Hawaii
Earl Leonard Woodward,	Cheney, Sedgwick

INDUSTRIAL JOURNALISM

William Brown Kappel,	Glasco, Cloud
Warren Cecil Nuzman,	Soldier, Jackson
Josephine Price Perrill,	Manhattan, Riley

SUBFRESHMEN—SECOND YEAR.

Myrtle Elnora Aelts,	Inman, McPherson
Harry Edwin Alexander,	Council Grove, Morris
Robert Edwin Anderson,	Chanute, Neosho
Ethel May Arnold,	Manhattan, Riley
Walter Hubert Artman,	Denison, Jackson
William Frederic Asendorf,	Garden Plain, Sedgwick
Madge Gladys Austin,	Manhattan, Riley
Helen Azella Badger,	Manhattan, Riley
Grace Bahling,	Montezuma, Gray
Blanche Baird,	Manhattan, Riley
Lowell Edwin Baldwin,	Garnett, Anderson
Joseph Vernon Baptist,	Emporia, Lyon
Fred Wesley Barker,	Burns, Marion
Lester Ford Barnes,	Fontana, Miami
Annie Estella Barnum,	Simpson, Cloud
Henry Barrett,	Pratt, Pratt
Irene Mary Barrett,	Manhattan, Riley
Edith Mildred Batchelor,	Manhattan, Riley
Dora Wilhelmina Bayer,	Toronto, Woodson
Fred Harold Bayer,	Yates Center, Woodson
Theodore Lawrence Bayer,	Yates Center, Woodson
Arthur Joseph Bayles,	Manhattan, Riley
Esther Grace Bayles,	Riley, Riley
Beryl Beaty,	Linn, Washington

SUBFRESHMEN—SECOND YEAR—CONTINUED

Name.	Post office and county (or state).
Lois Viola Bellomy,	Salina, Saline
Elsie Kathrina Bergstrom,	May Day, Riley
Marjorie Berryman,	Maplehill, Wabaunsee
Dee Daniel Bird,	Great Bend, Barton
Carlos Tomas Bischoff,	Manhattan, Riley
Alma Franc Bishop,	Glasco, Cloud
Henry Elton Bixler,	Manhattan, Riley
Alma Letha Blair,	Netawaka, Jackson
James Gillpatrick Blunt,	Greeley, Anderson
Hazel Marie Blythe,	White City, Morris
Joseph Alvin Bogue,	Glasco, Cloud
George Adam Bolz,	North Topeka, Shawnee
Forrest Fleet Booker,	Beloit, Mitchell
Ruth Mae Bowers,	Holcomb, Finney
Arthur Hayes Brewer,	Dresden, Decatur
Louis Lebold Brinkman,	Great Bend, Barton
Zada Agnes Brooks,	Tescott, Ottawa
Lora Kathryn Brown,	Dwight, Morris
Arthur Browne,	Burdett, Pawnee
Genevieve Vador Bruce,	Manhattan, Riley
Wesley Gordon Bruce,	Manhattan, Riley
Paul David Buchanan,	Chanute, Neosho
Lillian Anna Buchheim,	Winkler, Riley
Ralph Buell,	Winfield, Cowley
Doris Arbelle Burkhead,	Beloit, Mitchell
Everett Milton Burkhead,	Beloit, Mitchell
William Edwin Burwell,	Jarbalo, Leavenworth
Frank Swartz Campbell,	Dwight, Morris
Margaret Lucile Carey,	Manhattan, Riley
James Carle,	Gretna, Phillips
Effie May Carp,	Wichita, Sedgwick
Emil Edgar Cartwright,	Burlington, Coffey
Clarence Burton Chapman,	Manhattan, Riley
Edmund Ramsey Chastian,	De Graff, Butler
Bung Chew Choy,	Honolulu, Hawaii
Forrest Edwards Clark,	Riley, Riley
Melvil Jordan Cleland,	Manhattan, Riley
Robert Earl Cleland,	Manhattan, Riley
Miller Livingston Coe,	Manhattan, Riley
Charles Henry Coleman,	Emporia, Lyon
Charles Elwood Connor,	Manhattan, Riley
Sarah Alda Conrow,	Manhattan, Riley
Letha Viola Cooper,	Manhattan, Riley
Lorena Mae Cooper,	Manhattan, Riley
Robert Francis Copple,	Glasco, Cloud
Robert Travis Corbin,	Manhattan, Riley
Alice Janet Counter,	Cuba, Republic
Harold Robert Cozine,	Linn, Washington
Robert Brown Craig,	Clarendon, Texas
Madge Ellen Crawford,	Paola, Miami
Clare Estella Crissman,	St. John, Stafford
William Lester Croxton,	Powhatan, Brown
Simon Edward Croyle,	New Cambria, Saline
Charles Elbert Curtis,	Manhattan, Riley
Esther Curtis,	Manhattan, Riley
Robert Elliott Curtis,	Manhattan, Riley
William Henry Curtis,	Ogden, Riley
Della Edythe Daniel,	Manhattan, Riley
George Frank Daniel,	Manhattan, Riley

SUBFRESHMEN—SECOND YEAR—CONTINUED

Name.	Post office and county (or state).
Hazel Fay Daniel,	Manhattan, Riley
Frice Davies,	Arkalon, Seward
Alex Mort Davis,	Manhattan, Riley
Franklin Dane Davis,	St. George, Pottawatomie
Gertrude Davis,	Manhattan, Riley
Jessie Edith Davis,	Manhattan, Riley
Margaret Elizabeth Davis,	Lyons, Rice
Oscar Nuten Davis,	Altamont, Labette
George Harbord De Baum,	Bushong, Lyon
Robert Oren Deming,	Oswego, Labette
Frank Alfred Detweiler,	Summerfield, Marshall
Helen Detweiler,	Summerfield, Marshall
Glen Ewing Devier,	Fall River, Greenwood
Howard Arden De Wees,	Salina, Saline
Robert Albert Dillon,	Hope, Dickinson
John Monroe Dodrill,	Stockton, Rooks
Roy Burton Dodrill,	Stockton, Rooks
Lester Henry Drayer,	Manhattan, Riley
Stella Rose Drayer,	Manhattan, Riley
Merton Edward Dull,	Westphalia, Anderson
Nadia Dunn,	Manhattan, Riley
Forest Joseph Eaton,	Grinnell, Gove
John Frederick Eggerman,	Manchester, <i>Oklahoma</i>
James Culp Elsea,	Lake City, Barber
Ralph Emslie,	Manhattan, Riley
Floyd Spencer Evans,	Manhattan, Riley
Morris Evans,	Topeka, Shawnee
Frances Floretta Ewalt,	Junction City, Geary
Clarence Arnold Fickel,	Manhattan, Riley
Lodema Pearl Fitzwater,	Manhattan, Riley
Geneva Mabel Forsberg,	Manhattan, Riley
Edward Raymond Frank,	Manhattan, Riley
John Edward Franz,	Rozel, Pawnee
Vernon Frank Fritz,	Valencia, Shawnee
Edwin Scott Gahan,	Manhattan, Riley
Ivan Starr Glenn,	Lecompton, Douglas
Marie Antoinette Goodman,	Dwight, Morris
Jennie Marie Goodsheller,	McPherson, McPherson
Edward Gregory,	Manhattan, Riley
Mary Louise Gregory,	Manhattan, Riley
Albert William Griffeth,	Barnard, Lincoln
Glen Griffith,	Uniontown, Bourbon
Frank Harold Gulick,	Winfield, Cowley
William Witt Haggard,	Topeka, Shawnee
Blanche Mary Haggman,	Kackley, Republic
Benjamin John Hahne,	Dodge City, Ford
Preston Hale,	Manhattan, Riley
Ina Ilo Hall,	Eudora, Douglas
Esther Ida Hammond,	Manchester, Dickinson
Faith Hathaway Harling,	Manhattan, Riley
Zora Harris,	Manhattan, Riley
Earl Raymond Harrouff,	Inman, McPherson
Frederick George Hartwig,	Goodland, Sherman
Floyd Hawkins,	Marysville, Marshall
Edwin August Hayen,	Marion, Marion
Theodosia Hays,	Manhattan, Riley
Arthur Hensleigh,	Winchester, Jefferson
Chester Albern Herrick,	Colony, Anderson
Homer Arthur Herrick,	Colony, Anderson

SUBFRESHMEN—SECOND YEAR—CONTINUED

Name.	Post office and county (or state).
Clarence Joseph Hildebrand,	Manhattan, Riley
Ruben Earl Hixon,	Manhattan, Riley
Edna Letha Hoke,	Manhattan, Riley
William Oscar Hollis,	Overbrook, Osage
Dalton Ray Hooton,	Garnett, Anderson
Dick Hopper,	Manhattan, Riley
Henry Robert Horak,	Munden, Republic
Alma Alice Houser,	Grainfield, Gove
William Eugene Houser,	Topeka, Shawnee
Lon Victor Howell,	Morganville, Clay
Dwight Ellsworth Hull,	Abilene, Dickinson
Albert Glen Hunt,	Manhattan, Riley
Ruth Roba Hunt,	Manhattan, Riley
Frank Ira,	St. John, Stafford
Dan Niel Jackson,	Mayo, Comanche
Walter Raleigh Jackson,	Williamsburg, Franklin
Adolph Lawrence Jantz,	Larned, Pawnee
Edward Ladislav Jelinek,	Bluff City, Harper
Elmer John Johnson,	Lawrence, Douglas
Esther Bessie Johnson,	Peabody, Marion
Hulda Dorothy Johnson,	Marquette, McPherson
John Oscar Johnson,	Dwight, Morris
Mattie Ruth Johnson,	Peabody, Marion
Francis Norwood Jordan,	Manhattan, Riley
Emil Oliver Jorgenson,	Manhattan, Riley
Bruce Roy Keller,	Meade, Meade
Herbert Bennerd King,	Arkansas City, Cowley
Elmer Glen Kirkwood,	Larned, Pawnee
Evelyn Nellie Kizer,	Manhattan, Riley
Talbot Roy Knowles,	Wichita, Sedgwick
Leroy Forest Kriehagen,	Independence, Montgomery
Harry Bernard Lamer,	Salina, Saline
Lawrence Lykins Lauver,	Paola, Miami
Alpha Glen Ledbetter,	Canton, McPherson
Mary Edith Myrtle Limbocker,	Manhattan, Riley
John Linn, Jr.,	Manhattan, Riley
Emily Doris Lofinck,	Manhattan, Riley
Otto Montross Low,	Estes Park, Colorado
Pang Kong Lum,	Honolulu, Hawaii
Lyla Edith Lundberg,	Manhattan, Riley
Irene Margaret McElroy,	Manhattan, Riley
Cecil Lyman McFadden,	Stafford, Stafford
Doris Lena McKee,	Manhattan, Riley
Mary Elizabeth McKinlay,	New Albany, Wilson
Harold Clarence McKinney,	Dresden, Decatur
Bessie Olive McMillan,	Home, Marshall
Elsie Faye McSparrin,	Manhattan, Riley
Halcy Myrtle McSparrin,	Manhattan, Riley
Donald Eugene MacLeod,	Holton, Jackson
Elva Ione Mall,	Manhattan, Riley
Ivor Orin Mall,	Manhattan, Riley
Lethe Marshall,	Manhattan, Riley
Marguerite Irene Marshall,	Clifton, Washington
Sylvester Samuel Marshall,	Manhattan, Riley
Eugene Roy Martin,	Utopia, Greenwood
Sadie Minda Marvin,	Emporia, Lyon
Carl Ivar Mattson,	Manhattan, Riley
Emma Ruth Maxwell,	Bala, Riley
Edna Sadie May,	Auburn, (Wabaunsee)

SUBFRESHMEN—SECOND YEAR—CONTINUED

Name.	Post office and county (or state).
Kittie May,	La Cygne, Linn
Frank Harry Miles,	La Grange, <i>Illinois</i>
Charlie Samuel Miller,	Garfield, Pawnee
Clayton Coble Miller,	Wichita, Sedgwick
Jesse Benedict Miller,	Langdon, Reno
Katherine Miller,	Abbyville, Reno
Gladys Reginia Monroe,	Fredonia, Wilson
Ellis Morrill Moore,	Manhattan, Riley
Free Moore,	Pratt, Pratt
John Wilson Morrill,	Lebanon, Smith
Agnes Loretta Morrison,	Willow Springs, <i>Missouri</i>
Leo Clifford Moser,	Courtland, Republic
Opie Olan Mowrey,	Luray, Osborne
Royal Merritt Mullen,	Labette, Labette
Zenith Mullen,	Labette, Labette
Mack Myers,	Lebanon, Smith
Richard Baldwin Myers,	Jeffersonville, <i>Indiana</i>
Junia Edith Nelson,	Wamego, Pottawatomie
Eunice Nicolay,	Manhattan, Riley
Mary Francis Nicolay,	Manhattan, Riley
Henry Otis Niehaus,	Whiting, Jackson
Inez Melicent Olson,	Manhattan, Riley
William Byron Orange,	Manhattan, Riley
Charles Maxwell Osmer,	Wamego, (Wabaunsee)
Amos John Maynard Ostlind,	McPherson, McPherson
Caroline Roberts Packard,	North Topeka, Shawnee
Arthur Oris Park,	Tyro, Montgomery
Edith Parkhurst,	Kinsley, Edwards
Anna Lillian Patton,	Manhattan, Riley
John Thomas Pearson,	Parsons, Labette
Earle Mason Peck,	Berryton, Shawnee
Glen Roscius Peck,	Manhattan, Riley
Essie Leah Peterson,	Parker, Linn
Fritz Edwin Peterson,	Kansas City, Wyandotte
Mamie Grace Peterson,	Manhattan, Riley
Gladys Marie Phillips,	Manhattan, (Pottawatomie)
Howard Waitman Phillips,	Hutchinson, Reno
Edna Pickrell,	Leon, Butler
Floyd Meredith Pickrell,	Leon, Butler
Alma Luella Pile,	Arkalon, Seward
Perrie Richmond Pitts,	Manhattan, Riley
Olive Clara Potter,	New Albany, Wilson
Jesse Emmons Pribble,	Montezuma, Gray
Blanche Lulla Purinton,	Banner, Trego
Ray Marion Purinton,	Banner, Trego
Grover Ward Putman,	Larned, Pawnee
Charles Warren Quinn,	Dwight, Geary
Mary Hazel Radke,	St. John, Stafford
Marion Capps Reed,	Havensville, Pottawatomie
Ward Irving Reed,	Havensville, Pottawatomie
Raymond Gilfillan Reeve,	Garden City, Finney
Aaron William Reitz,	Olathe, Johnson
Grace Christena Reitz,	Olathe, Johnson
Nell Magdalena Reitz,	Olathe, Johnson
Robert Hall Rexroad,	Darlow, Reno
Glenn Annel Riley,	Manhattan, Riley
Howard Calhoun Robertson,	Manhattan, Riley
Carl Otto Roda,	Paradise, Russell
Mary Elsie Rose,	Paola, Miami

SUBFRESHMEN—SECOND YEAR—CONTINUED

Name.	Post office and county (or state).
Orvid Vance Russell,	New Albany, (Elk)
Anna Belle Sage,	Berryton, Shawnee
Carew Henry Sanders,	Manhattan, Riley
August Ernest Schattenburg,	Manhattan, Riley
George McClellan Schick,	Plainview, <i>Texas</i>
Margaret Ursula Schneider,	Logan, Phillips
Samuel Waldo Schneider,	Logan, Phillips
Elbie Alfred Schroeder,	Lebanon, Smith
Marie Madra Schultheis,	Hoxie, Sheridan
Lee Asthon Scott,	Westphalia, Anderson
Alta May Seal,	Macksville, (Pawnee)
Everett Gladstone Shimmin,	Manhattan, Riley
Robert Kane Shimmin,	Manhattan, Riley
Clarence Newton Simcox,	Canton, McPherson
Nora Marguerite Simonson,	Manhattan, Riley
Allen Thurman Smith,	La Cygne, (Miami)
Charles Warren Smith,	Manhattan, Riley
Ferd Griswold Smith,	Rago, Kingman
Loyd Hudson Smith,	Lawrence, Douglas
Mollie Manerva Smith,	Westphalia, Anderson
William Whitney Smith,	Manhattan, Riley
Amanda Mary Spaniol,	Manhattan, Riley
Leonard Keith Sparks,	Greensburg, Kiowa
Clarence Stadel,	Hoyt, Jackson
Jesse Stagg,	Manhattan, Riley
Ernest Boyd Stewart,	Morganville, Clay
Velda Elizabeth Stewart,	Morganville, Clay
Amelia Cora Still,	Manhattan, Riley
Esther Elizabeth Stonge,	Riley, Riley
Anna Rosaline Straka,	McPherson, McPherson
Iva Viola Strebel,	Alton, Osborne
Hartwell Sullivan,	Bazaar, Chase
Francis Edgar Sweet,	Manhattan, Riley
Joseph Burton Sweet,	Manhattan, Riley
Clifford Levern Swenson,	Lindsborg, McPherson
Mary Fidelia Taylor,	Newton, Harvey
Earl Hicks Teagarden,	Wayne, Republic
Jessie Viola Tecter,	Canton, McPherson
Lester Bertis Thiele,	Junction City, Geary
Raymond Floyd Timmerman,	Vesper, Lincoln
Eva Denell Towner,	Manhattan, Riley
Albert Clinton Townsend,	Burlington, Coffey
Ruby Lillian Travis,	Manhattan, Riley
Marie Alice Troutman,	Comiskey, Lyon
Lester Tubbs,	Glade, Phillips
John Bennett Underwood,	Syracuse, Hamilton
Alexander Unruh,	Pawnee Rock, Barton
Chester Arthur Van Dusen,	<i>Cuyamaloya, Mexico</i>
William Lafayette Van Dusen, Jr.,	<i>Cuyamaloya, Hidalgo, Mexico</i>
Frank Van Haltern,	Downs, Osborne
Charles Foster Van Neste,	Lawrence, Douglas
Harry Fred Vaupel,	New Cambria, Saline
Ora Leroy Vawter,	Beverly, Lincoln
Jean Ada Waldraven,	Winkler, Riley
Joseph Kelly Walker,	Ellsworth, Ellsworth
Viola Elva Wallace,	Abilene, Dickinson
Charlotte Pearl Wartenbee,	Liberal, Seward
Mamie Bell Wartenbee,	Liberal, Seward
Thomas Edgar Welch,	Emporia, Lyon

SUBFRESHMEN—SECOND YEAR—CONCLUDED

Name.	Post office and county (or state)
Ossian William Wheeler,	Garden City, Finney
Joe Marshall White,	Topeka, Shawnee
Julia May White,	Manhattan, Riley
Raymond Hazzelton Whitenack,	Hope, Dickinson
Wilma Elsie Whitmore,	Manhattan, Riley
Alice Letitia Williams,	Sylvan Grove, Lincoln
Clarence Burton Williams,	Bigelow, Marshall
Jessie Irene Williams,	Beloit, Mitchell
Lee Scott Williams,	Sylvan Grove, Lincoln
Clarence Willyard,	Manhattan, Riley
Carey Ray Witham,	Manhattan, Riley
Ermille George Witter,	Manhattan, Riley
Aletha Brady Wolfe,	Manhattan, Riley
Elsie Wolfenbarger,	Winkler, Riley
Corwin Sleagle Wolgamott,	Roswell, New Mexico
Dorothy Agnes Woodman,	Manhattan, Riley
Elizabeth Pearl Woods,	Wichita, Sedgwick
Bertha Effie Wreath,	Manhattan, Riley
James Carl Yost,	Vassar, Osage
Lester Lincoln Zieber,	Pawnee Rock, Barton
Herman Henry Zimmerman,	Belle Plaine, Sumner
Louis Albert Zimmerman,	Belle Plaine, Sumner

SUBFRESHMEN—FIRST YEAR

Daniel Boyd Abel,	Ness City, Ness
Clinton Conrad Albers,	Hargrave, Rush
Arthur Alexander,	Wichita, Sedgwick
Myrtle Christine Anderson,	Vesper, Lincoln
Hans Peter Andreson,	Vesper, Lincoln
Helen Verchel Applegate,	Wamego, Pottawatomie
Frank Sylvester Archer,	Fort Scott, Bourbon
Harry Jonas Austin,	Manhattan, Riley
Alfred Le Roy Aydelotte,	Bushong, Wabaunsee
Paul Kitchell Baker,	Cherryvale, Montgomery
Ralph Vernon Baker,	Cherryvale, Montgomery
Nancy Mary Barbite,	Manhattan, Riley
Lynne Louis Barnette,	Independence, Montgomery
Harry Hamilton Bearman,	Floto, Stanton
Elmer George Becker,	Meriden, Jefferson
Charles Francis Bernhardt,	Vesper, Lincoln
Harry Emory Best,	Manhattan, Riley
Mabel Charlotte Binder,	Manhattan, Riley
Elna Elizabeth Blom,	Concordia, Cloud
Nora Margaret Boettcher,	Winkler, Riley
Stella Marie Boggs,	Clyde, Cloud
Belle Bowen,	Arnold, Ness
Lillian Bowen,	Arnold, Ness
Arthur William Boyer,	Abilene, Dickinson
Inez Martha Brandt,	Manhattan, Riley
Aaron Andrew Brechein,	Edgerton, Douglas
Gilbert Douglas Brent,	El Dorado, Butler
Palmer Fair Bressler,	Manhattan, Riley
Ralph Strahn Bristow,	Williamsburg, Franklin
Fred Burt Broadbent,	Beloit, Mitchell
Clarence Curtis Brown,	Dwight, Morris
Herbert Norton Brown,	Beloit, Mitchell
John David Brown,	Dinas, Wallace
Karl William Brown,	Manhattan, Riley

SUBFRESHMEN—FIRST YEAR—CONTINUED

Name.	Post office and county (or state).
Richard Hoag Browne,	Burdette, Pawnee
Herman George Brumm,	Manhattan, Riley
Raymond Alfred Bryson,	Lyndon, Osage
Noel Adrain Burt,	Hallet, Hodgeman
Albert Clarence Bux,	Meriden, Jefferson
Frank Elias Byram,	Clements, Chase
Charles Le Roy Caldwell,	Grinnell, Gove
John Charles Campbell,	Manhattan, Riley
Levah Campbell,	Manhattan, Riley
Lysle McCord Campbell,	Manhattan, Riley
Alice Leonilla Carey,	Manhattan, Riley
Evelyn Dulcina Carey,	Manhattan, Riley
Helen Junita Carey,	Manhattan, Riley
Emma Adina Carlson,	Randolph, Riley
Bessie Lavera Carp,	Wichita, Sedgwick
Floyd Casement,	Sedan, Chautauqua
Millard Vere Casto,	Wilmore, Comanche
Herbert Frank Chapin,	Kansas City, Wyandotte
Glenn Dell Chartier,	Clyde, Cloud
Frank Stantley Christian,	Maplehill, Wabaunsee
Guy Harrison Christian,	Maplehill, Wabaunsee
May Elizabeth Christian,	Maplehill, Wabaunsee
Merril Aikman Cissell,	Manhattan, Riley
Harry Cavis Clark,	Washington, Washington
Ida Bainbridge Cluff,	Lyndon, Osage
Russell Fesler Coffey,	Geneva, Allen
Everett Pardon Colburn,	Manhattan, Riley
Wiley Buchanan Compton,	Ray, Pawnee
Louie Gregg Conwell,	North Topeka, Shawnee
Arthur Everett Cook,	Russell, Russell
Anna Marie Cox,	Manhattan, Riley
James Walter Cracraft,	Kansas City, Wyandotte
Walter Crotts,	Woodsdale, Stevens
Charles Fredrick Croyle,	New Cambria, Saline
Dora Ferne Curtis,	Manhattan, Riley
Mary Carolyn Curtis,	Manhattan, Riley
Orrin Leonard Davis,	Salina, Saline
Stuart Reynolds Davis,	Oakhill, Clay
William Vernon Davis,	Manhattan, Riley
Harold Jacob Deitz,	Preston, Pratt
Ruth Denison,	Prescott, Linn
William David Denny,	Protection, Comanche
David Dick,	Buhler, Reno
Claude Andrew Dillon,	Berwyn, Oklahoma
Lovie Elizabeth Dittman,	Downs, Osborne
John Julius Doebert,	Manhattan, Riley
John Crim Dow,	Emporia, Lyon
Robert Aron Downing,	Lowemont, Leavenworth
Charles Henry Drashner,	Belleview, Republic
Harry Leslie Drown,	Manhattan, Riley
Robert Leroy Duffy,	Manhattan, Riley
John Donnelley Dunlap,	Eureka, Greenwood
Alma Edith Dusenberry,	Mankato, Jewell
Maggie Ellis,	Westmoreland, Pottawatomie
Paul John Englund,	Falun, Saline
George Errebo,	Vesper, Lincoln
Hans John Errebo,	Vesper, Lincoln
Clarence Jinks Etherington,	Neal, Greenwood
Charles Francis Ethridge,	Chanute, Neosho

SUBFRESHMEN—FIRST YEAR—CONTINUED

Name.	Post office and county (or state).
Jesse Wesley Ewing,	Great Bend, Barton
Herbert Carl Eye,	Talmage, Dickinson
Fay Farber,	Hoxie, Sheridan
Fern Farber,	Hoxie, Sheridan
Elmer Harry Fenton,	Manhattan, Riley
Frank Alvan Finney,	Ogden, Riley
John Fitzgerald,	Gypsum City, Saline
Lennart Elof Florell,	Jamestown, Cloud
Frank Herbert Fox,	Sterling, Rice
Alice Delta Frantz,	Canton, McPherson
George Adam Franz,	Rozel, Pawnee
Bertha Marie Frey,	Manhattan, Riley
Lee Lorren Fuller,	Beloit, Mitchell
Myna Louise Fuller,	Manhattan, Riley
Genevieve Funk,	Marion, Marion
John Henry Gardner,	Parsons, Labette
Jesse Conrad Geiger,	Wichita, Sedgwick
Henry Harrison Geiser,	Beloit, Mitchell
Kate Elizabeth Giles,	Manhattan, Riley
William Albro Giles,	Manhattan, Riley
Bernie Edward Gleason,	Manhattan, Riley
Ray Franklin Glover,	Meriden, Shawnee
Albert Charles Graffam,	Homewood, Franklin
Eva Helena Grandfield,	Wichita, Sedgwick
David Mason Greene,	Manhattan, Riley
Elvan Marshall Griffey,	Marysville, Marshall
Lector Griffin,	Greensboro, <i>North Carolina</i>
Eslie Edgar Gulick,	Winfield, Cowley
Frank King Hansen,	Penalosa, Kingman
Sadie Harris,	Americus, Lyon
Jack Calvert Hart,	Wichita, Sedgwick
Frieda Louise Haslam,	Manhattan, Riley
Charles Hendricks Hayen,	Marion, Marion
Clifford Sparticus Hazen,	Wayne, Republic
Emra Adam Hepler,	Manhattan, Riley
Roscoe Easter Hey,	Manhattan, Riley
Elmer Dewey Hilbush,	Eskridge, Wabaunsee
Madge Elena Hixon,	Manhattan, Riley
Arthur James Hoffman,	Manhattan, Riley
Merton Anderson Hoke,	Manhattan, Riley
Alfred Earl Holladay,	Spearville, Ford
Bertha Lydia Holladay,	Spearville, Ford
Leda Leah Holt,	Manhattan, Riley
Samuel Willet Honeywell,	Poe, Logan
Jesse Jason Hoover,	Overbrook, Osage
William Albert Houk,	Americus, Lyon
Mabel Amanda Howard,	Manhattan, Riley
Hadley Stanton Hudson,	Fort Scott, Bourbon
Ralph Hull,	Hoisington, Barton
Lester Charles Hunt,	Manhattan, Riley
Nellie Elizabeth Hunt,	Manhattan, Riley
Ralph Edward Hunter,	Palmer, Washington
Philip John Hutchings,	Manhattan, Riley
Gilford John Ikenberry,	Quinter, Gove
Hattie Genevieve Jackson,	Manhattan, Riley
Samuel James,	Riley, Riley
Carle Albert Johnson,	McPherson, McPherson
Myron Ernest Johnson,	Morse, Johnson
Anna Marie Johnston,	Manhattan, Riley

SUBFRESHMEN—FIRST YEAR—CONTINUED

Name.	Post office and county (or state)
Raymond James Jolly,	Manhattan, Riley
Clifford Grant Jones,	Wichita, Sedgwick
Israel Clifford Jones,	Emporia, Lyon
Ralph Edward Jones,	Moline, Elk
Horace Lynelen Kapka,	Kansas City, Wyandotte
Frank Keiser,	Havana, Montgomery
Minta Gloria Keller,	Manhattan, Riley
George Ewing Kennedy,	Manhattan, Riley
Leland Perry Kennedy,	Lenexa, Johnson
Archibald Kernohan,	Nashville, Kingman
Gertrude Dorothy Kimball,	Manhattan, Riley
Clare Kimport,	Dellvale, Norton
Arthur Sellard's Kitchen,	Burlingame, Osage
Lawrence Kitchen,	Burlingame, Osage
Willard Lester Kjellin,	Garrison, Pottawatomie
Alice Alinda Krehbiel,	Moundridge, McPherson
Dan Glen Lake,	Lake City, Barber
Russell Lake,	Lake City, Barber
Ella Luverne Landon,	Manhattan, Riley
Luther Martin Larson,	Marquette, McPherson
Clay Forrest Laude,	Rose, Woodson
Lada Joseph Lebeda,	Caldwell, Sumner
Nyle Eloise Lewallen,	Manhattan, Riley
Charles Lee Lindenberger,	Canton, McPherson
Martha Molly Loeffler,	Linn, Washington
Fergus Alfonso Logan,	Hutchinson, Reno
Richard Thomas Lough,	Fort Scott, Bourbon
Doris McCaslin,	Osborne, Osborne
Vernon Clare McCaslin,	Manhattan, Riley
Lester Pearl McDowell,	North Topeka, Shawnee
Gertrude Elizabeth McElroy,	Manhattan, Riley
Oakley Calvin McIntosh,	Washington, Washington
Dollie Leora McKee,	Westmoreland, Pottawatomie
Matthew Edward McMichael,	Plainville, Rooks
Lillian Mae McNergney,	Sabetha, Nemaha
Earl Allen Manker,	Manhattan, Riley
Ira John Marriage,	Mullinville, Kiowa
Earle Leon Martin,	Parsons, Neosho
Charles William Matherly,	Manhattan, Riley
William Vincent Mawson,	Wathena, Doniphan
Anna Maria Maxell,	Cleburne, Pottawatomie
Hobart Irwin May,	Seward, Stafford
Ralph Birtrum Medlin,	Manhattan, Riley
Arthur Henry Mertell,	Kansas City, Wyandotte
Edna Mabel Metz,	Jewell City, Jewell
Martin Raymond Meyer,	Clifton, Washington
Mildred Irene Miley,	Dresden, Sheridan
Reuben Miller,	Milford, Geary
William Cloud Mills,	Lake City, Barber
Edna Mitchell,	Manhattan, Riley
Helen Mitchell,	Manhattan, Riley
Donald Aaron Monroe,	Fredonia, Wilson
Roe Floy Montgomery,	Carthage, Missouri
Claude Franklin Morey,	Manhattan, Riley
George Giffin Moss,	Richland, Shawnee
Frank Wilson Muir,	Stockton, Rooks
Curt Richard Muller,	Manhattan, Riley
Hortense Myers,	Fort Scott, Bourbon
Chester Parker Neiswender,	North Topeka, Shawnee

SUBFRESHMEN—FIRST YEAR—CONTINUED

Name.	Post office and county (or state).
Carrie Ada Neusbaum,	Manhattan, Riley
Harold Granville Newton,	Manhattan, Riley
Mabel Alma Nienhke,	Manhattan, Riley
Virgil Harrison Noah,	Beloit, Mitchell
Arthur Trueman Norby,	Cullison, Pratt
Melvin Barnard Norby,	Cullison, Pratt
Alice Eugenia Olson,	Manhattan, Riley
Wenner Stanley Olson,	Chanute, Neosho
Thomas Alvah Park,	Neosho Falls, Woodson
Gladys Isabel Patterson,	Clifton, Clay
Nevels Pearson,	Manhattan, Riley
Charles Ray Pell,	Hiawatha, Brown
Frances Marie Elizabeth Peterson,	Leonardville, Riley
Lillie Marie Peterson,	Vesper, Lincoln
Samuel David Petrie,	Praitt, Pratt
Fred Pollom,	North Topeka, Shawnee
William Robert Pryor,	Fredonia, Wilson
Henry Edward Rahe,	Winkler, Riley
Anna Margaret Railsback,	Oberlin, Decatur
George Washington Randle,	Riley, Riley
Joey Edwin Randle,	Riley, Riley
Thomas Floyd Ratcliff,	Dexter, Cowley
Zeno Clifford Rechel,	Hutchinson, Reno
James Everett Redburn,	El Dorado, Butler
Mary Ann Redden,	Gypsum, Saline
Ralph Josiah Richards,	Manhattan, Riley
Ruth Longstaff Ridenour,	Emporia, Lyon
Edward Stanton Riley,	Dover, (Wabaunsee)
Floyd Clifford Roadhouse,	Portis, Osborne
Ples Scott Robbins,	Yates Center, Woodson
William Herman Roda,	Paradise, Russell
Harold Edwin Roe,	Vinland, Douglas
Joe Edward Roesler,	Holyrood, Ellsworth
Fred Lokke Ross,	Montrose, Jewell
Fred Arnold Rukes,	Richland, (Osage)
Anton Sigmund Sadlowski,	Manhattan, Riley
Jessie Euphemia Sage,	Auburn, Shawnee
Robert James Sage,	Silver Lake, Shawnee
Edmond Barstow Sayler,	St. John, Stafford
Hugh Howard Scherer,	St. John, Stafford
Dan Codroy Scheufler,	Great Bend, Barton
Elias Eli Scheufler,	Great Bend, Barton
Frank Schwartz,	Winkler, Riley
Chester McKinley Scott,	Manhattan, Riley
Ruby Pearl Scott,	Manhattan, Riley
Dennis William Scully,	Belvue, Pottawatomie
Cornelia Bessie Sedivy,	Blue Rapids, Marshall
Alma Ruth Shafer,	Manhattan, Riley
Maude Mae Shaner,	Riley, Riley
David Loyd Signor,	Manhattan, Riley
Ramah Sittersen,	Roper, <i>North Carolina</i>
Harry Arthur Slocum,	Manhattan, Riley
Lydia Libbie Smerchek,	Irving, Marshall
Curtis Smith,	Manhattan, Riley
Frances Colista Snyder,	Lawrence, Jefferson
Lorraine Ross Snyder,	Bucklin, Ford
Tillie Snyder,	Dover, Shawnee
George William Sova,	Harper, Harper
Elsie Ceola Spencer,	Penokee, Graham

SUBFRESHMEN—FIRST YEAR—CONCLUDED

Name.	Post office and county (or state).
Nellie Gertrude Spencer,	Penokee, Graham
Stewart Ward Spencer,	St. John, Stafford
Abraham Perry Steele,	Morrowville, Washington
Rose Elizabeth Straka,	McPherson, McPherson
Andrew Streumpf,	Walker, Ellis
Abbie Swafford,	Manhattan, Riley
Cleda Geneva Taylor,	Manhattan, Riley
Charlie Teague,	Collyer, Trego
Nellie Opal Thompson,	Gypsum, (McPherson)
Forest Thornburgh,	Jetmore, Hodgeman
Frank Sylvester Toms,	La Harpe, Allen
Harland Beal Town,	Valencia, Shawnee
Minnie Elizabeth Towner,	Manhattan, Riley
Clayton Powell Trivett,	Eskridge, Wabaunsee
Gail Morris Umberger,	Elmdale, Chase
Florence Kate Venneberg,	Havensville, Pottawatomie
Emmett Daniel Vilander,	Manhattan, Riley
Frank Cyril Waldron,	Louisburg, Miami
Leona Marie Ward,	Banner, Trego
Miles Robert Watt,	Walton, Harvey
Henry Coats Webb,	Crestline, Cherokee
Dora Martha Wendelburg,	Stafford, Stafford
Ernest Westbrook,	Peabody, Marion
Ernest Lawrence White,	Deerfield, Kearny
Lloyd Le Roy Whitney,	Lyndon, Osage
Gilbert Clark Whitsitt,	Manhattan, Riley
Cecil Clayton Willars,	Glasco, Cloud
Bowman Minor Williams,	Belen, <i>New Mexico</i>
Earl Renolds Williams,	Hutchinson, Reno
Embre Lloyd Williams,	Bigelow, Marshall
John Matthews Williams,	Kansas City, Wyandotte
Nina Evelyn Williams,	Beloit, Mitchell
Charlie Owen Williamson,	Manhattan, Riley
Homer Bryan Willis,	Manhattan, Riley
Leon Brewer Wilson,	Manhattan, Riley
Clarence Jesse Windisch,	Louisburg, Miami
Jesse Banks Wingfield,	Dwight, Geary
Chauncey Witcraft,	Arkansas City, Cowley
Jesse Marsden Witham,	Manhattan, Riley
Wilbur William Wright,	Newton, Harvey
Amelia Mary Wulffkuhle,	Lecompton, Douglas
Gertrude Yenkey,	Grantville, Jefferson

SPECIAL STUDENTS

Mildred Clara Abel,	Ness City, Ness
Earl Aurora Ames,	Olathe, Johnson
George Edgar Anderson,	Manhattan, Riley
Marien Thomas Anderson,	Garfield, Pawnee
Clara Ducene Appelroth,	Olsburg, Pottawatomie
Oley Glenn Apt,	Buffalo, Wilson
Frances Viola Aspley,	Abilene, Dickinson
Mildred Josephine Barger,	Smith Center, Smith
Harry Eldred Barstow,	Bryan, <i>Ohio</i>
Frank Bergier,	Glasco, Cloud
Mary Olive Bliss,	Kansas City, Wyandotte
Caleb Bodmer,	Russell, Russell
Guy Camdon Boling,	Capron, <i>Oklahoma</i>
James Burns Bond,	Bala, Riley

SPECIAL STUDENTS—CONTINUED

Name.	Post office and county (or state).
Nell Bayles Boyd,	Wichita, Sedgwick
Stephen Gilbert Britton,	Parsons, Labette
Stanley Walton Brown,	Caney, Montgomery
Carl Herman Budde,	Wakefield, Clay
Annie May Bursch,	Buffalo, Wilson
Alfred Vivian Byarlay,	Bala, Riley
John Casement,	Sedan, Chautauqua
Floyd Cleland,	Hiattville, Bourbon
William O'Neil Collins,	Wellsville, Franklin
Horace Edward Cormack,	Solomon, Dickinson
Verne Abner Craven,	Erie, Neosho
John Elijah Croxton,	Manhattan, Riley
Grace Evaleena Darlington,	Denison, Jackson
Henry Walter Davidson,	Junction City, Geary
Harlan Deaver,	Sabetha, Nemaha
James Jay Donelan,	Manhattan, Riley
Arthur Douglas,	Manhattan, Riley
Orrin Pomeroy Drake,	Manhattan, Riley
Harry Dallas Dunavan,	Fort Scott, Bourbon
Robert Hamilton Dunavan,	Fort Scott, Bourbon
Clide Euler,	Blair, Doniphan
Walter Walker Fairall,	Kansas City, Wyandotte
Mary Farwell,	Fredonia, Wilson
Louis Fulton,	Sabetha, Nemaha
Mary Emma Giles,	Manhattan, Riley
Mary Elizabeth Gleed,	Topeka, Shawnee
Archibald Alexander Glenn,	Webb City, Missouri
Harry Conn Guthrie,	Oklahoma City, Oklahoma
Agnes Amelia Hamilton,	Blue Rapids, Marshall
John Hancock,	Menlo, Thomas
William Headrick,	Enterprise, Dickinson
Isaac Wesley Hehn,	Marion, Marion
Herbert Hirsch,	Kansas City, Missouri
Billy Bluford Holland,	Manhattan, Riley
Judson Dean Howard,	Olathe, Johnson
(Mrs.) Margaret Howard,	Colby, Thomas
John Hubbell Hudson,	Carrollton, Missouri
Clarence Alfred Hulse,	Meriden, Jefferson
Esta Jane Hungerford,	Soldier, Jackson
Daniel Hampton Hunt,	Bigelow, Marshall
Edwin Gilbert Jacobson,	Roswell, New Mexico
John Rufus Jacobson,	Roswell, New Mexico
Edna Faye Jamison,	Louisburg, Miami
Ralph Jamison,	Sterling, Rice
Marguerite Hartwell Johnson,	Garden City, Finney
Amuel Edwin Jones,	Wymore, Nebraska
Merritt Lincoln Keithline,	Shannon, Atchison
Ferne Kellogg,	Lebanon, Smith
Paul Teninson Kitchen,	Burlingame, Osage
Katrine Krudop,	Manhattan, Riley
Homer Luther Lichty,	Morrill, Brown
Charles Robert Lucas,	Johnston, Stanton
William Ruben Lynch,	Admire, Lyon
Helen Pearl McClanahan,	Manhattan, Riley
Mattie Anna McComb,	Alma, Wabaunsee
Michael James McCormack,	Lake Linden, Michigan
Festus Claudis McKay,	Crooked River, Jamaica
Alvin Marshall,	Manhattan, Riley
Ottie Florence Martin,	Garden City, Finney

SPECIAL STUDENTS—CONCLUDED

Name.	Post office and county (or state).
Franz Benedict Mayer,	Newton, Harvey
Hazel Irene Messersmith,	Manhattan, Riley
Charles Edmund Mitchell,	Manhattan, Riley
Harry Allyson Moore,	Manhattan, Riley
Foster Morton,	Green, Clay
Edith Reed Nichols,	Manhattan, Riley
Mary Alice Northrup,	Iola, Allen
James O'Connell,	Kiowa, Barber
Dustin Glenville O'Harro,	Manhattan, Riley
Mabel Elvira Olson,	Concordia, Cloud
Millie Sophia Oltmanns,	Halstead, Harvey
Will Edward Palmer,	Hays, Ellis
Lorenzo Ray Parker,	Linn, Washington
Joseph Price Perrill,	Manhattan, Riley
Annette Perry,	Manhattan, Riley
Leslie Plumb,	Pleasanton, Linn
Willis Davidson Price,	Reading, Lyon
Walter Roy Quinn,	Bennington, Ottawa
Jay Reeves,	Hutchinson, Reno
Herman Regier,	Moundridge, Harvey
Daniel Julius Roenigk,	Morganville, Clay
Florence Kathryn Rose,	Manhattan, Riley
Paul Emerson Schauer,	Mapleton, Bourbon
Samuel Paul Schiess,	New York City, New York
Rosalia Michael Shafer,	Manhattan, Riley
Cedric Hadaway Shaw,	Pratt, Pratt
Edwin Alpheus Sheets,	Topeka, Shawnee
Frank Bennett Sherrill,	Kansas City, Missouri
Regina Adams Spellman,	Kansas City, Missouri
Leah Spring,	Bern, Nemaha
Nettie Emma Diana Stafford,	Bloomington, Osborne
Ellsworth Fisher Stewart,	Parsons, Labette
Ira Sylvanus Stinson,	Sylvan Grove, Lincoln
Frank Allen Stockwell,	Havensville, Pottawatomie
Ida Martha Sylvester,	Riley, Riley
Ethel Inez Theis,	Wichita, Sedgwick
Eleanor Thomas,	Manhattan, Riley
Frances Mae Train,	Blue Rapids, Marshall
(Mrs.) Grace Utt,	Manhattan, Riley
Ida Helder Voiles,	Manhattan, Riley
Margaret Campbell Waldrauen,	Manhattan, Riley
Roy Nelson Walker,	Atchison, Atchison
Robert Mortimer Washington,	Manhattan, Riley
Alice Marguerite Webster,	Manhattan, Riley
Ethel Leota Webster,	Manhattan, Riley
Clarence George Wellington,	Salina, Saline
Dietrich Virgel Wiebe,	Lehigh, Marion
Gertrude Wiley,	Arkansas City, Cowley
Dick Williams,	Concordia, Cloud
Everett Henry Withroder,	Plevna, Reno
George Fred Woelk,	Russell, Russell
Archie Leon Woods,	Douglass, Butler
Ena Wood,	Solomon, Dickinson
Walter Fred Young,	Marissa, Illinois

SUMMER SCHOOL

Name.	Post office and county (or state).
Hattie Julia Abbott,	Manhattan, Riley
Carl Adams,	Manhattan, Riley
Katherine Adams,	Manhattan, Riley
Ruth Harriet Aiman,	Manhattan, Riley
Pearle Akin,	Manhattan, Riley
Clara Grace Alexander,	Manhattan, Riley
Kate Alexander,	Welda, Anderson
Myra Amsden,	Manhattan, Riley
John Henry Anderson,	Lebanon, Smith
Justina Marinda Andrews,	Norcatur, Decatur
Mamie Arnold,	Cottonwood Falls, Chase
Clayton Arthur Axtom,	Great Bend, Barton
(Mrs.) Laura Axtom,	Great Bend, Barton
Malcolm Aye,	Manhattan, Riley
Raymond Albert Baldwin,	Atchison, Atchison
Ethel May Balmer,	Hiawatha, Brown
George Austin Barnard,	Madison, Greenwood
Margaret Lewis Barrows,	Atchison, Atchison
Ethel Mary Bass,	Wakefield, Clay
Ellen Margaret Batchelor,	Manhattan, Riley
Borden Frazier Beck,	Republic, Republic
Nannie Beisly,	Wamego, Pottawatomie
Ora Ohio Bell,	Kansas City, Missouri
Mabel Bennett,	Manhattan, Riley
(Mrs.) Huberta Mary (Hall) Berg,	Manhattan, Riley
Willis Ernest Berg,	Cleburne, Riley
Clara Anna Bergh,	Newton, Harvey
Mary Berthelson,	Sylvia, Reno
Elisha Lynd Boothe,	Caney, Montgomery
Ada Boyd,	Glen Elder, Mitchell
Lawrence E. Brennan,	Maplehill, Wabaunsee
Lola Edna Brethour,	Green, Riley
Fleda May Brock,	Jewell City, Jewell
Frank Broom,	Wakefield, Clay
Marion Percival Broughten,	Marysville, Marshall
Cosby Lee Brown,	Kansas City, Missouri
Katie Magdalene Burns,	Alta Vista, Wabaunsee
James Henry Bert,	Manhattan, Riley
Irene Mabel Bushnell,	Coffeyville, Montgomery
Floy Caldwell,	Manhattan, Riley
Georgia Canfield,	Belleville, Republic
Mary Alice Canfield,	Belleville, Republic
May Cantly,	Buffalo, Wilson
Virginia Cantly,	Buffalo, Wilson
Effie May Carp,	Wichita, Sedgwick
Nellie Mae Carpenter,	Paola, Miami
Ethel Esther Cary,	Manhattan, Riley
Clarence Chamberlain,	Topeka, Shawnee
Wah Kai Chang,	Honolulu, Hawaii
Ella Rebecca Chitty,	Frankfort, Marshall
Clara Fae Chitwood,	Ozawkie, Jefferson
Alfred Lester Clapp,	Yates Center, Woodson
Ida Fra Clark,	Colony, Anderson
Luther James Coblenz,	Topeka, Shawnee
Charles Elwood Connor,	Manhattan, Riley
Ralph Andrew Cooley,	Manhattan, Riley
Ida Almira Cordry,	Parsons, Labette
Ema Elizabeth Cowan,	Athol, Smith
Merton Leroy Cozine,	Linn, Washington

SUMMER SCHOOL—CONTINUED

Name.	Post office and county (or state).
Mabel Crammond,	Clifton, Washington
Grace Lucile Craven,	Manhattan, Riley
Verne Abner Craven,	Erie, Neosho
Reva Violet Cree,	Manhattan, Riley
Ruby Belle Croxton,	Manhattan, Riley
Esther Curtis,	Manhattan, Riley
Aubrey Elbert Davidson,	Manhattan, Riley
Earl Edward Davis,	Dunavant, Jefferson
Roy Ira Davis,	Plevna, Reno
Grace Harriet Detlor,	Grantville, Jefferson
Cora DeVault,	Ocheltree, Johnson
Jessie Jane DeVault,	Ocheltree, Johnson
Fanny Dilsaver,	Athol, Smith
Anna Dixon,	Junction City, Geary
Harriet Ellen Dunn,	Manhattan, Riley
Walter Maynard Eastman,	Lawrence, Douglas
(Mrs.) Maude E. Edwards,	Manhattan, Riley
(Mrs.) Nellie Ferrin Ely,	Coldwater, Comanche
Emmett Keeler Emslie,	Manhattan, Riley
Anna Hattie Ericson,	Lindsborg, McPherson
Ura May Estes,	Medford, Oklahoma
Alta Manora Evans,	Manhattan, Riley
Donald Brown Ewing,	Manhattan, Riley
Lilla Cecil Farmer,	Atma, Comanche
Hazel Marie Fawl,	Silver Lake, Shawnee
Clara Irene Fenton,	Junction City, Geary
Rowena Fessenden,	Clifton, Washington
Bertha Finck,	Rosedale, Wyandotte
Harold Fish,	Centerville, Linn
Maude Jewel Fitzpatrick,	Hutchinson, Reno
Fred Ira Fix,	Manhattan, Riley
Mary Elizabeth Foresman,	Paola, Miami
Lena Fossler,	Norcatur, Decatur
Ruth Lucile Foster,	Hiawatha, Brown
Richard William Getty,	Downs, Osborne
Josephine Lura Gilmore,	Manhattan, Riley
Edith Lois Givens,	Manhattan, Riley
John Homer Goheen,	Manhattan, Riley
Ida Janet Goodman,	Lyndon, Osage
Marie Antoinette Goodman,	Dwight, Morris
Fred Eugene Goodrich,	Topeka, Shawnee
Grace Graham,	Altoona, Wilson
Lottie Gugenthaler,	May Day, Riley
Minnie Agnes Gugenthaler,	May Day, Riley
Cliff Struthers Hamilton,	Manhattan, Riley
Boline Hanson,	Jamestown, Republic
Harry Robert Haury,	Moundridge, McPherson
Olive Wentworth Hartwell,	Wichita, Sedgwick
Nola Mae Hawthorne,	Gypsum, Saline
Vera Hawthorne,	Gypsum, Saline
William Hendershot,	Manhattan, Riley
John Russell Hewitt,	Manhattan, Riley
Paul McGee Hewitt,	Attica, Harper
Jennie Hill,	Beloit, Mitchell
Katherine Harriett Hinkle,	El Dorado, Butler
Helen Marie Hockersmith,	Beloit, Mitchell
Charles Franklin Holladay,	Spearville, Ford
Edith Antoinette Holmberg,	Manhattan, Riley
George Benjamin Holmes,	Manhattan, Riley

SUMMER SCHOOL—CONTINUED

Name.	Post office and county (or state).
Lena Honey,	Junction City, Geary
Mary Hoover,	Manhattan, Riley
Hattie Poynz Hord,	Colony, Anderson
Esther Lydia Hostetler,	Manhattan, Riley
Eva Hostetler,	Manhattan, Riley
Nora Melissa Hott,	Hiawatha, Brown
Ethel Margaret Hotte,	Manhattan, Riley
Lura Beatrice Houghton,	Manhattan, Riley
Martha Elizabeth Huey,	Ogden, Riley
Arthur Sinclair Hull,	Nickerson, Reno
Eva Pearl Hull,	Lawrence, Douglas
Forrest Huntington,	Ellinwood, Barton
Margaret Anne Huston,	Manhattan, Riley
Garnet Leona Hutto,	Manhattan, Riley
Carl Laurencious Ipsen,	Cleburne, Pottawatomie
Frances Marion Ivy,	Tescott, Ottawa
Frank Chadron Johnson,	Fredonia, Wilson
Marguerite Hartwell Johnson,	Garden City, Finney
Anthony Edmund Karnes,	Overbrook, Osage
(Mrs.) Anthony Edmund Karnes,	Overbrook, Osage
Mary Anna Kellam,	Hutchinson, Reno
Myrtle Kelley,	Topeka, Shawnee
Pauline Kennett,	Concordia, Cloud
Harry Lewellyn Kent,	Hays, Ellis
Mary Elizabeth Kimble,	Manhattan, Riley
Minnie Luella King,	Lexington, Clark
Vera Belle Kizer,	Manhattan, Riley
Grace Matilda Kolterman,	Manhattan, Riley
John Albert Larson,	Chanute, Wilson
Claire Lewallen,	Manhattan, Riley
Lee Roy Light,	Norton, Norton
Clarence H. Lillie,	Burlington, Coffey
Hazel Viola Limbocker,	Manhattan, (Pottawatomie)
Howard Allen Lindsley,	Arcadia, Crawford
Erma Elizabeth Lock,	Riley, Riley
Fletcher A. Lovan,	Fort Scott, Bourbon
Lillie Edna Lundberg,	Manhattan, Riley
Gertrude Anna Lyman,	Manhattan, Riley
Laura Belle Lyman,	Fairview, Brown
Thomas Daniel Lyons,	Manhattan, Riley
Helen Pearl McClanahan,	Manhattan, Riley
Mayme McCluskey,	Junction City, Geary
(Mrs.) Maude Nonamaker McColloch,	Osborne, Osborne
Rachel McCoy,	Manhattan, (Pottawatomie)
Rose Margaret McCoy,	Manhattan, (Pottawatomie)
(Mrs.) Jessie Katherine McGuire,	Hutchinson, Reno
Iona McKeeman,	Manhattan, Riley
Gladys Enola McKelvy,	Waterville, Marshall
Mabel Mortier McKenzie,	Solomon, Dickinson
Preston Essex McNall,	Gaylord, Smith
Mary Elizabeth McNamara,	Manhattan, Riley
Alpha McVey,	Hill City, Graham
Marguerite Viola McVey,	Hill City, Graham
Nellie Frances McVey,	Hill City, Graham
Pauline Mack,	Salina, Saline
Sophia Elizabeth Maelzer,	Centralia, Nemaha
Madeline Marshall,	Clifton, Washington
Marguerite Irene Marshall,	Clifton, Washington
Golda Estella Masters,	Manhattan, Riley

SUMMER SCHOOL—CONTINUED

Name.	Post office and county (or state).
Gertrude Helen Miller,	Langdon, Reno
Margret Ellenor Moore,	Idana, Clay
Tillie Moore,	Junction City, Geary
Clinton Hawthorn Morgan,	Hays, Ellis
Elmer Barrett Myers,	Hutchinson, Reno
Charles Marion Neiman,	White Water, Butler
Winifred Louise Neusbaum,	Manhattan, Riley
Myra Myrtle Nicholson,	Manhattan, Riley
Josie Ellen Nicolay,	Scranton, Osage
Ida Mae Northorp,	Salina, Saline
Martha Lois Noyes,	Manhattan, Riley
Paulina Osmer,	Irving, Marshall
Lois Fae Paddock,	Marion, Marion
Ellen Elizabeth Page,	Topeka, Shawnee
Anna Lillian Patton,	Dighton, Lane
Lawrence Todd Perrill,	Chapman, Dickinson
Ralph Crawford Perrill,	Chapman, Dickinson
Avis Albertha Perry,	Chapman, Dickinson
Melva Gay Perry,	Manhattan, Riley
Grace Pershing,	Ogallah, Trego
Thomas Reed Peters,	Rosedale, Wyandotte
Edwin William Pierce,	Bison, Rush
Herbert Roy Pierce,	Seely, Cowley
Howard Pierce,	Topeka, Shawnee
Marcia Pierce,	Junction City, Geary
Thurza Elizabeth Pitman,	Manhattan, Riley
Henry James Plumb,	Pleasanton, Linn
Hudson Edward Powers,	Ellinwood, Barton
Ethelyn Pearl Pray,	Manhattan, Riley
George Pulliam,	Nickerson, Reno
Clara Ann Randle,	Kansas City, Wyandotte
Helen Edna Rannells,	Manhattan, Riley
Harold Records,	Manhattan, Riley
Etta Reed,	Clay Center, Clay
Christine Rentschler,	Manhattan, Riley
Mary Rhodes,	Maize, Sedgwick
Esther Katherine Richards,	Manhattan, Riley
Martha Melissa Richards,	Clay Center, Clay
Franco Thomas Rosado,	<i>Isabela, Occ. Negros, P. I.</i>
Finlay Ross,	Wichita, Sedgwick
Pontus Henry Ross,	Webber, Jewell
Fred Ruffner,	Beloit, Mitchell
Adah Catherine Sachau,	Manhattan, Riley
Clara Louise Sachau,	Manhattan, Riley
Elias Eli Scheufler,	Great Bend, Barton
Walter Schirmer,	Holton, Jackson
Margaret Washburn Schultz,	Manhattan, Riley
Ludwig Joseph Schwab,	Partridge, Reno
Samulie Matilda Schwensen,	Junction City, Geary
Arthur Auldred Scott,	San Marcos, <i>Texas</i>
(Mrs.) Nora Elizabeth Scott,	San Marcos, <i>Texas</i>
Mary Delilah Sechrist,	Meriden, Jefferson
Minnie Sequist,	Eskridge, Wabaunsee
John Festus Shafer,	Manhattan, Riley
Minnie Shaffer,	Sedalia, <i>Missouri</i>
Virgie G. Sherwood,	Manhattan, Riley
Nelle Shideler,	Topeka, Shawnee
Merl Hudson Sims,	Wellsville, Franklin
Anna Maude Smith,	Lyons, Rice

SUMMER SCHOOL—CONCLUDED

Name.	Post office and county (or state).
Florence Hazel Smith,	Manhattan, Riley
Susie Louise Smith,	Hutchinson, Reno
Vesta Smith,	Parsons, Labette
Clara Spaniol,	Plevna, Reno
Amelia Cora Still,	Manhattan, Riley
Lola Dow Stoddard,	Manhattan, Riley
Mary Dow Stoddard,	Manhattan, Riley
John Stover,	Manhattan, Riley
William Allison Sumner,	Manhattan, Riley
May Symonds,	Peabody, Marion
Cassie Lydia Tanner,	Manhattan, Riley
Gail Tatman,	Manhattan, Riley
Irene Alma Taylor,	Chapman, Dickinson
Lorena Belle Taylor,	Zenith, Stafford
Cora Temporo,	Clay Center, Clay
Janet Mae Thayer,	Atchison, Atchison
Virginia Troutman,	Comiskey, Lyon
Bernice Truesdell,	Lyons, Rice
Bertha Truesdell,	Lyons, Rice
Catherine Tupper,	Lawrence, Douglas
Chester Francis Turner,	Manhattan, Riley
Marcia Elizabeth Turner,	Manhattan, Riley
William Turner,	Rock Creek, Jefferson
Fayette Tweedy,	Manhattan, Riley
Pearl Bell Twyman,	Herington, Dickinson
Bertha Louisa Tyler,	Marysville, Marshall
Katherine Florence Van Noy,	Tribune, Greeley
Edgar Allen Vaughn,	Toronto, Woodson
Leslie Walker,	Mankato, Jewell
Rose Wallace,	Brookville, Saline
Bessie Blanch Walsh,	Clay Center, Clay
Echo Ward,	Fort Collins, Colorado
Edward Anthony Ward,	Langston, Oklahoma
Eva Kingman Watson,	Leavenworth, Leavenworth
Blanche Westenhaver,	Manhattan, Riley
(Mrs.) Lola Whitelaw,	Cheney, Sedgwick
Vera Isabelle Whitmore,	Manhattan, Riley
Flora Wiest,	Manhattan, Riley
Nina Marie Williams,	Winfield, Cowley
Clarence Williamson,	Rosedale, Wyandotte
Luther Earle Willoughby,	Alton, Osborne
Charles Clements Wolcott,	Garfield, Pawnee
Retta Womer,	Womer, Smith
Frank Edwin Wood,	Wamego, Pottawatomie
Albert Mun Yim,	Honolulu, Hawaii
Aara Etta Zimmerman,	Olathe, Johnson

HOME ECONOMICS SHORT COURSE

Sylvia Elizabeth Achten,	Wetmore, Nemaha
Pearl Armine Adams,	St. John, Stafford
Esther Bertha Anderson,	Agenda, Republic
Esther Edelia Anderson,	Falun, Saline
Florence Ethel Anderson,	Lincoln, Lincoln
Ruth Sophia Ellen Anderson,	Beattie, Marshall
Grace Bahling,	Montezuma, Gray
Caroline Bahnmaier,	Lecompton, Douglas
Marjorie Florence Bardshar,	Mt. Hope, Sedgwick
Dayse Barnes,	Manhattan, Riley

HOME ECONOMICS SHORT COURSE—CONTINUED

Name.	Post office and county (or state).
Mattie Ellen Beard,	Riley, Riley
Alma Franc Bishop,	Glasco, Cloud
Madge Bishop,	Conway Springs, Sumner
Abbie Carroll Bonney,	Kansas City, Wyandotte
Nell Bayles Boyd,	Wichita, Sedgwick
Agnes Brandt,	Great Bend, Barton
Anna Brandt,	Great Bend, Barton
Nellie Brindle,	Fredonia, Wilson
Lelba Belle Brooks,	Home, Marshall
Helen Charlotte Bryson,	Manhattan, Riley
Lou Sidney Burgess,	Russellville, <i>Arkansas</i>
Levena Minnesota Cammack,	Manhattan, Riley
Eunice Elizabeth Carter,	Russell, Russell
Josephine Carter,	Garden City, Finney
Faye Foster Clemons,	Topeka, Shawnee
Florence May Cochran,	Topeka, Shawnee
Nellie Cochran,	Topeka, Shawnee
Alice Collier,	Manhattan, Riley
Helen Kathleen Collister,	Manhattan, Riley
Margaret Eunice Colwell,	Emporia, Lyon
Myrtle Mary Colwell,	Emporia, Lyon
Winifred Elanor Conroy,	Manhattan, Riley
Helen Louise Cooper,	Pendennis, Lane
Marie Cope,	Topeka, Shawnee
Marguerite Elizabeth Crans,	Eureka, Greenwood
Ruth Cross,	Downs, Osborne
Ada Elnora Crottinger,	Manhattan, Riley
(Mrs.) Rose Belle Culver,	Yates Center, Woodson
Helen Deeds,	Lyons, Rice
Edith Velma Denbo,	Great Bend, Barton
Evelyn Amy Denman,	Manhattan, Riley
Ida Marcella Denman,	Clifton, Washington
Eva Dewey,	Manhattan, Riley
Marie Dewey,	Manhattan, Riley
Grace Erwin,	Kinsley, Edwards
Selma Elvira Finney,	Lindsborg, McPherson
Velma Fleming,	Meriden, Jefferson
Hildur Regina Florell,	Jamestown, Republic
Edna Erma Fuest,	Liberal, Seward
Florence Marie Galloway,	Harper, Harper
Mary Elizabeth Gleed,	Topeka, Shawnee
Cora Elizabeth Goode,	Olathe, Johnson
Julia Edna Graffham,	Homewood, Franklin
Dorothy Margaret Grant,	Kansas City, <i>Missouri</i>
Ethel Graves,	Wellsville, Franklin
Margaret Francis Graves,	Dunlap, Morris
Anna Frances Gray,	Lyons, Rice
Eva Logusta Hahn,	Muncie, Wyandotte
Hattie Halley,	St. John, Stafford
Ethel Viola Hallock,	Ada, Ottawa
Maude Ahyers Hamilton,	Manhattan, Riley
Julia Henrietta Hammel,	Manhattan, Riley
Alice Eliza Haney,	Courtland, Republic
Laura Isabel Haney,	Courtland, Republic
Della Mae Haury,	Moundridge, McPherson
Delpha Mary Hazeltine,	Wetmore, Nemaha
Zoa May Henderson,	Wilsey, Morris
Carlotta Christine Hendricks,	Concordia, Cloud
Anna Margaret Hickert,	Lenora, Norton

HOME ECONOMICS SHORT COURSE—CONTINUED

Name.	Post office and county (or state).
Marie Josephine Hickert,	Lenora, Norton
Lydia Alwennia Hildenbrand,	Lecompton, Douglas
Ile Effie Hillman,	Glen Elder, Mitchell
Sarah Matilda Hoefer,	Tampa, Marion
Hazel Elsie Hogle,	Burlingame, Osage
Anna Laura Hostinsky,	Cuba, Republic
Ruth Isabel Hughes,	Topeka, Shawnee
Katherine Ruth Hutto,	Manhattan, Riley
Beulah Clare Icely,	Wa Keeney, Trego
Ruth Jackson,	Mayo, Comanche
Ellen Marie Jameson,	Manhattan, Riley
Bessie Edwill Jay,	Wichita, Sedgwick
Mary Florence Jones,	Salina, Saline
Norma Kathrens,	Arrington, Atchison
Ethel Harriet Keller,	Chapman, Dickinson
Jessie Elaine Kessler,	Wichita, Sedgwick
Gertrude May Knittle,	Salina, Saline
Jessie Blanche Kiser,	Manhattan, Riley
Frances Mary Kraupatz,	Wilson, Ellsworth
Mary Katharine Kraupatz,	Wilson, Ellsworth
Alice Alinda Krehbiel,	Moundridge, McPherson
Alberta Frances Kuchera,	Cuba, Republic
Edna Lucile Ladenberger,	Hoisington, Barton
Coleta Margaret Leonard,	Lenora, Norton
Fern Lilly,	Wichita, Sedgwick
Agnes Margaret Lindsay,	Conway Springs, Sumner
Ruth Alphie Lindstrom,	Cleburne, Riley
Ira Roberta Logan,	Hutchinson, Reno
Gertrude Murrel Loomis,	Alton, Osborne
Trean Deida Lowdermilk,	Iola, Allen
Mabel McCormick,	Zeandale, Riley
Mary Fern McCormick,	Zeandale, Riley
Martha Louise McElwain,	Lyons, Rice
Mary Winifred McElwain,	Lyons, Rice
Mary Farrar McKellips,	Beloit, Mitchell
Edith Florence Mack,	Manhattan, Riley
Ruth Lovara Marshall,	Garnett, Anderson
Ottie Florence Martin,	Garden City, Finney
Bertha Mae Marty,	Manhattan, Riley
Eunice Matthews,	Fredonia, Wilson
Virgie May Meairs,	Waverly, Coffey
Carrye Myrtle Meldrum,	Cedar Vale, Chautauqua
Gertrude Mae Mills,	Smith Center, Smith
Rose Emma Mongrain,	Silverdale, Cowley
Edna Willis Monroe,	Ottawa, Franklin
Ruth Evelena Monson,	Kackley, Republic
Vera Irene Moon,	Garden City, Finney
Ethel Lenore Morris,	Kansas City, Missouri
Florence Stella Morrison,	Salina, Saline
Hazel Edith Monsher,	Kinsley, Edwards
Rosalie Victoria Nelson,	McPherson, McPherson
Ninetta Neusbaum,	Manhattan, Riley
Laura Newell,	Stafford, Stafford
Eliza Nixon,	Eureka, Greenwood
Mary Alice Northrup,	Iola, Allen
Ruby Mary O'Donnell,	Wetmore, Nemaha
Zorado Sara Owens,	Manhattan, Riley
Clara May Paddock,	Manhattan, Riley
Nellie Alveretta Peck,	Tecumseh, Shawnee

HOME ECONOMICS SHORT COURSE—CONCLUDED

Name.	Post office and county (or state).
Josephine Woodward Perry,	Manhattan, Riley
Anna Elizabeth Peterson,	Smolan, Saline
Bessie Mary Fohl,	Wilson, Ellsworth
Anna Bernice Pratt,	Manhattan, Riley
Mary Margherita Robertson,	Holton, Jackson
Etta Fay Reid,	Elmont, Shawnee
Mary Elsie Rose,	Paola, Miami
Margaret Jane Ross,	Smith Center, Smith
Ada Anderson Rowden,	St. John, Stafford
Ida Anderson Rowden,	St. John, Stafford
Verna Olga Russell,	New Albany, Wilson
Hilda Ruth,	Halstead, Harvey
Stella Clara Ruth,	Hesston, Harvey
Mary Sawyer,	McPherson, McPherson
Rosa Schlaefli,	Cawker City, Mitchell
Verna Jane Schumacher,	Marysville, Marshall
Gladys Shinn,	Russellville, Arkansas
Laura Belle Shoop,	St. John, Stafford
Veronica Marguerite Sittner,	Ottawa, Franklin
Grace Small,	Anness, Sedgwick
Mollie Manerva Smith,	Wesphalia, Anderson
Gladys Mignon Snyder,	McPherson, McPherson
(Mrs.) Ellen Steely,	Hiawatha, Brown
Mabel Stevenson,	Keota, Kiowa
Maurine Francis Stevenson,	Salina, Saline
Myrtle Eloise Stuart,	Zeandale, Riley
Esther Rebecca Swanson,	Randolph, Riley
Pearl Ellice Tackett,	Yates Center, Woodson
Elsie Jane Thomas,	Chapman, Dickinson
Mabel Thompson,	Garrison, Pottawatomie
Mayme Mary Thompson,	Fredonia, Wilson
Bertha Anna Tuttle,	Burns, Butler
Zella Antonia VanLeewen,	Vesper, Lincoln
Leah Esther Vernon,	Washington, Washington
Anne Hazel Vezie,	La Cygne, Linn
Lulu Rhuanna Wakefield,	Wilsey, Morris
Virginia Walton,	Wichita, Sedgwick
Ethel May Warren,	Superior, Nebraska
Coralee West,	Yates Center, Woodson
Mabel Adeline Whitsitt,	Manhattan, Riley
Ethel Alice Wilburn,	Lawrence, Douglas
Jennie Mae Williams,	Sylvan Grove, Lincoln
Nina Evelyn Williams,	Beloit, Mitchell
Sarah Fina Williams,	Sylvan Grove, Lincoln
Margurette Grace Worrel,	Manhattan, Riley
Mina Ruth Worth,	Pollard, Rice
Elizabeth Worthington,	Manhattan, Riley
Grace Helen Ziegler,	Junction City, Geary

FARMERS' SHORT COURSE—SECOND YEAR

Emory Ellsworth Baird,	North Topeka, Shawnee
Arthur Banninger,	Washington, Washington
Jordan Fred Bigham,	Ozawkie, Jefferson
Edward Leo Blaesi,	Abilene, Dickinson
Charles Walker Burk,	Clifton, Washington
Walter Constantine Carlgren,	Concordia, Cloud
William Henry Case,	Sterling, Rice
Floyd Cleland,	Hiattsburg, Bourbon

FARMERS' SHORT COURSE—SECOND YEAR—CONCLUDED

Name.	Post office and county (or state).
Lloyd James Cochran,	North Topeka, Shawnee
George Vernon Denbo,	Great Bend, Barton
Dietrick Dick,	Butler, Reno
Herbert August Droke,	Seneca, Nemaha
Ned Bluford Estes,	Stafford, Stafford
Joseph Oliver Ewing,	Kanopolis, Ellsworth
Clarence William Faidley,	Broughton, Clay
Harold Dwight Grimes,	Ottawa, Franklin
Frederick Ernest Haas,	Baldwin, Douglas
Frank Emerson Hakes,	Clyde, Cloud
Virgil Clifford Hall,	Emporia, Lyon
Maurice Allen Hamer,	Lawrence, Douglas
Albert Wellington Hargreaves,	Abilene, Dickinson
Reiner Edgar Hartwig,	Barneston, <i>Nebraska</i>
Chester Leland Hendershot,	Darlow, Reno
Carl Otto Jennrich,	Russell, Russell
Allen Lauren Kelsey,	North Topeka, Shawnee
Myron Scott Kelsey,	North Topeka, Shawnee
Edward Louis Kesl,	Cuba, Republic
Clarence King,	Potwin, Butler
Mayo Kingsbury,	Oswego, Labette
Elwood Lawson Klepinger,	Conway, McPherson
Frank Tomizo Kobayashi,	Kansas City, Wyandotte
Walter Raynold Krueger,	Marion, Marion
Roy Lockard,	Dillon, Dickinson
Jacob Regier Lohrentz,	Moundridge, Harvey
George Maxwell Long,	St. John, Stafford
Homer McCandless,	St. John, Stafford
John McNary,	Sabetha, Nemaha
Ralph Waldo May,	Williamstown, Jefferson
Edward James Meyer,	Clifton, Washington
William Ernest Mueller,	Stafford, Stafford
August Nels Nelson,	Girard, Crawford
Ernest Fredolf Olson,	Osage City, Osage
Archie Ross Quinette,	Ames, Cloud
Roy Austin Railsback,	Langdon, Reno
Thomas Lester Reed,	Circleville, Jackson
Gustav Regier,	White Water, Butler
Henry Reimer,	Inman, McPherson
Lawrence Robert Ricklefs,	Troy, Doniphan
Phil Joe Samuelson,	Frankfort, Marshall
Ralph Ray Sanders,	Osage City (Lyon)
Joseph Garey Schmitt,	Tipton, Mitchell
Guy Seidle,	Eureka, Greenwood
Charles Albert Seymour,	Rantoul, Franklin
Orton Shrader,	Enterprise, Dickinson
David Smith,	Enterprise, Dickinson
Harvey Webb Staadt,	Ottawa, Franklin
Leo Matheny Torrence,	Arrington, Atchison
William John Tregemba,	Overbrook, Osage
Henry Wendelburg,	Stafford, Stafford
Edwin Preston Witherspoon,	Emporia, Lyon
Theodore Fred Witt,	Hudson, Stafford

FARMERS' SHORT COURSE—FIRST YEAR

Name.	Post office and county (or state).
Oliver Harry Abercrombie,	Gaylord, Smith
Fredrick John Achten,	Wetmore, Nemaha
George William Ackley,	Portis, Osborne
Albert Peter Adam,	Wakefield, Clay
James Renwick Adams,	Sterling, Rice
Arthur John Albers,	Severance, Doniphan
Albert Frank Albright,	Stockton, Rooks
Arthur Emil Anderson,	Ottawa, Franklin
James Roy Ardrey,	Stafford, Stafford
Henry Clay Aspley,	Abilene, Dickinson
Marvin Bahling,	Montezuma, Gray
Fred Richard Balman,	Rozel, Pawnee
Fred Cleveland Barber,	Abilene, Dickinson
Fred Wesley Barker,	Burns, Marion
Carrol Francis Barr,	Westmoreland, Pottawatomie
Walter Wesley Beggs,	Ensign, Gray
James Attison Bell,	Ackerland, Leavenworth
William Henry Bentley,	Pawnee Station, Bourbon
Arthur William Bicker,	Dunlap, Morris
Charles Leo Bigham,	Ozawkie, Jefferson
Frank Billan,	Hesston, Harvey
Walter Gotlieb Bircher,	Kanopolis, Ellsworth
Howard Walter Bowers,	Vermillion, Marshall
George Boyle,	Thayer, Neosho
Matthew Newton Bradley,	Neosho Falls, Woodson
Louis Lebold Brinkman,	Great Bend, Barton
Stephen Gilbert Britton,	Parsons, Labette
Floyd Acton Brown,	Sylvan Grove, Lincoln
Raymond Alfred Bryson,	Lyndon, Osage
William Esty Burch,	Leoti, Wichita
Ralph Owen Button,	Elmont, Shawnee
Warren Benjamine Carey,	Hoyt, Jackson
Frank Carlson,	Concordia, Cloud
Roscoe William Carson,	Hamilton, Greenwood
Ira Walter Clark,	Garfield, Pawnee
John Bryan Clemens,	Centralia, Nemaha
Ralph Burton Cole,	Washington, Washington
Joseph Phillip Collins,	Overbrook, Osage
Wiley Buchanan Compton,	Ray, Pawnee
Wilson Counts,	Baldwin, Douglas
Vern Allen Cozine,	Linn, Washington
Glen Clifford Crissman,	St. John, Stafford
Herman Ellis Crow,	Dexter, Cowley
William Lester Croxton,	Powhattan, Brown
Martin Dahl, Jr.,	Montrose, Jewell
Oliver Dam,	Marysville, Marshall
Clifford Byrl Dancer,	Stockton, Rooks
Elmer Arthur Davis,	Leonardville, Riley
Orrin Leonard Davis,	Salina, Saline
Wayne Ambrose DeLair,	Coldwater, Comanche
Charles Franklin DeMott,	Arkansas City, Cowley
Charley Clarence Denbo,	Great Bend, Barton
Charles Aubrey De Remer,	Edna, Labette
John DeWald,	Russell, Russell
Frank Dickerson,	Neola, Stafford
Oleah Roy Dodt,	Bucyrus, Miami
Vaughn Doyle,	Leonardville, Riley
Charles Emil Dralle,	Steward, Stafford

FARMERS' SHORT COURSE—FIRST YEAR—CONTINUED

Name.	Post office and county (or state).
Arthur Dresselhaus,	Lincoln, Lincoln
William Delano Dunlap,	Ottawa, Franklin
Charles Liston Dyas,	Formoso, Jewell
Roy Ellis,	Plainville, Rooks
Earl Wenger Engle,	Abilene, Dickinson
Charles Monroe Fanshier,	Great Bend, Barton
John Henry Fanshier,	Great Bend, Barton
Charles Robert Farwell,	Fredonia, Wilson
Roy Louis Faulhaber,	Brownlee, <i>Nebraska</i>
Frank Robert Fitzgerald,	Waterville, Marshall
Joseph Rognar Fredlund,	Axtell, Marshall
Charles Huntington French,	Silver Lake, Shawnee
Christian Adam Frey,	Abilene, Dickinson
George Edmond Friedrich,	Madison, Greenwood
Melvin Franklin Gardner,	Greenleaf, Washington
William Earl George,	St. John, Stafford
Earl David Gere,	Stafford, Stafford
William Ralph Gilmore,	Oakley, Logan
Herbert Luther Glaser,	Baldwin, Douglas
Clarence Edwin Gore,	Seward, Stafford
Paul Hahn,	Muncie, Wyandotte
Kenneth Columbus Hall,	Kingman, Kingman
Warren Algrich Hallock,	Ada, Ottawa
Walter Hargadine,	Mullinville, Kiowa
Walter Jacob Hauptli,	Glen Elder, Mitchell
Willard Henry Hayden,	Lawrence, Douglas
Hugh Heasty,	Mayfield, Sumner
Robert Arthur Hegle,	Lost Springs, Marion
Gustave Arthur Heinig,	Wichita, Sedgwick
Carl Wilhelm Hellwig,	Oswego, Labette
Maurice Charles Hinds,	Broughton, Clay
Herbert Hirsch,	Kansas City, <i>Missouri</i>
George Hobbie,	Tipton, Mitchell
Clifford Ardie Holmberg,	Reading, Lyon
George Washington Holt,	Pleasanton, Linn
John Horrigan,	Manhattan, Riley
Fred Randolph Hothan,	Circleville, Jackson
Archie Earl Hughes,	St. John, Stafford
Daniel Marvin Hull,	Bigelow, Marshall
Ernest Hull,	Wellington, Sumner
John Caleb Huston,	Ogden, Riley
Robert Clemet Irsik,	Everest, Brown
Henry Elza Jacobson,	Formoso, Jewell
Paul Ernest Jacobson,	Waterville, Marshall
Frank Robert Janne,	Dorrance, Russell
August Janssen,	Lorraine, Ellsworth
Albert Adam Janzen,	Lorraine, Ellsworth
Oscar Samuel Johnson,	Macksville, Pawnee
Lewis Hiram Johnston,	Manhattan, Riley
Robert Gordon Jones,	Bigelow, Marshall
Virgil Lewis Jones,	Otego, Jewell
Forest Glenn Joss,	Topeka, Shawnee
John Victor Keene,	Ottawa, Franklin
Perry Lester Keeney,	Pawnee Station, Bourbon
Ralph Elmer Kelling,	Cedar, Smith
James Douglas Kelsey,	Richmond, Franklin
Charles Clarence King,	Protection, Comanche
William Elmer Klamm,	Basehor, Leavenworth

FARMERS' SHORT COURSE—FIRST YEAR—CONTINUED

Name.	Post office and county (or state).
Milos Frank Knedlik,	Hanover, Washington
Julius Herbert Knudson,	Oisburg, Pottawatomie
Luther De La Vergne Landon,	Russell, Russell
William Irvin La Rosh,	Osborne, Osborne
Carl Edward Larson,	Smolan, Saline
John Gilbert Larson,	Jamestown, Republic
Harold Holman Leap,	Chetopa, Labette
Wilbur Meyers Liddell,	Ramona, Marion
Wesley Lind,	Leonardville, Riley
John Oliver Lorson,	Hope, Dickinson
Otto Lucke,	Girard, Crawford
Harry Herman Lynn,	Lenexa, Johnson
Calvert Cotton McCandless,	St. John, Stafford
Roy Roxton McClelland,	Olathe, Johnson
Leslie Cooper McFadden,	Halls Summit, Coffey
James Harvey McGee,	Olathe, Johnson
John Hervey McKee,	Culver, Ottawa
Warren Herbert McNichols,	Burr Oak, Jewell
Henry Adolph Maag,	Wathena, Doniphan
Leo Ripley Maguire,	Geneseo, Rice
Mark Walker Mails,	Tonganoxie, Leavenworth
Israel Markley,	Bennington, Ottawa
Arthur Wylie Martin,	Eskridge, Wabaunsee
Abraham Wiebe Matthies,	Buhler, Reno
Alois Mermis,	Graham, Russell
Sumner Gordon Merten,	Clay Center, Clay
Charles John Miller,	Junction City, Geary
Jonas Albert Miller,	Montrose, Jewell
Thomas John Miner,	Princeton, Franklin
George Pearl Morgan,	Soldier, Jackson
Charles Ross Moulton,	Marion, Marion
Opie Olan Mowrey,	Luray, Osborne
Harry Asa Muir,	Salina, Saline
Chester Loel Mullins,	Osawatomie, Miami
Walter Howard Meyers,	Anson, Sumner
John Robert Nauman,	Lawrence, Douglas
Raymond Neill,	St. John, Stafford
Everett Bingham Neiswender,	North Topeka, Shawnee
Augie Elten Nelson,	Viola, Sedgwick
George Meredith Newlin,	Hutchinson, Reno
Edward John Nottorf,	Dillon, Dickinson
Frank Oscar Pearson,	Simpson, Mitchell
Manford Elliott Peck,	Salina, Saline
Robert Perrelet,	Vermillion, Marshall
John Edward Pfrang,	Bancroft, Nemaha
Roy Charles Poland,	Chapman, Geary
Gabriel Philip Powers,	Garden City, Finney
Arthur Daniel Pratt,	Emporia, Lyon
Herbert Quinn,	Bennington, Ottawa
Chester Harvey Randall,	Dalton, Sumner
Lester C. Ratcliff,	Burr Oak, Jewell
Robert Gordon Ratcliff,	Dexter, Cowley
Walter Elwood Ratcliffe,	Gaylord, Smith
Walter Allen Reep,	Washington, Washington
Henry Stephens Reichert,	Vermillion, Marshall
Harold Jay Reynolds,	Kansas City, Missouri
Samuel Roy Reynolds,	Lawrence, Douglas
Edward Theobald Rinkel,	Haviland, Kiowa

FARMERS' SHORT COURSE—FIRST YEAR—CONCLUDED

Name.	Post office and county (or state).
James Keer Robb,	Mayetta, Jackson
Robert George Roda,	Paradise, Russell
Clifford Eugene Rundell,	Stafford, Stafford
Ray Albert Rundell,	Stafford, Stafford
Nelson Ephriam Samuelson,	Axtell, Marshall
Clarence Charles Schirmer,	Holton, Jackson
Henry Bernard Schneider,	Nortonville, Jefferson
Alvin Walter Schroer,	Winkler, Riley
Elmas Scott,	Kinsley, Edwards
John Roy Sellers,	Osawatomie, Miami
Samuel Joseph Shaner,	Riley, Riley
Roy David Skonberg,	Osage City, Osage
Frank Peter Smith,	Wheaton, Pottawatomie
James Ellis Smith,	Peru, Chautauqua
Ralph Rolla Snyder,	Neodesha, Wilson
Harry Rudolph Sommer,	Hope, Dickinson
Thomas Joseph Sommer,	Hope, Dickinson
Archie Green Sowers,	Leon, Butler
Everet James Starkey,	Wellsford, Pratt
Ernest Edward Steuri,	Great Bend, Barton
John Bert Stevenson,	Beverly, Lincoln
Franze Esper Stewart,	Haviland, Kiowa
Hubbard Oscar Stockwell,	Larned, Pawnee
William Henry Strobel,	Pratt, Pratt
Stanley Swenson,	Leonardville, Riley
James Tarpey,	Richland, Shawnee
Albert Lyman Tate,	Cummings, Atchison
Walter Maxwell Tedford,	Minneola, Clark
Howard McKinley Tilzey,	Tipton, Mitchell
Rollie Orville Tobias,	Pratt, Pratt
Roy Henry Torrence,	Baileyville, Nemaha
Albert Reuben Tucker,	Great Bend, Barton
Vern Lee Vanlandingham,	Kingman, Kingman
Archie Dennis Van Petten,	Washington, Washington
William Russell Van Twyl,	Basehor, Leavenworth
George William Vawter,	Carbondale, Osage
Reuben Samuel Vilander,	Manhattan, Riley
Lucius Alfred Vischer,	Florence, Marion
Frank Joseph Wacek,	Irving, Marshall
Embry Loyal Wahl,	Manhattan, Riley
Troy Irtis Warren,	Attica, Harper
Merl James Watson,	Clafin, Barton
Joseph Weissbeck,	Collyer, Trego
Linn Justin White,	Downs, Osborne
John Clarence Wilke,	Troy, Doniphan
Leroy Melvin Wilkins,	Miltonvale, Cloud
Frank Edwin Will,	Vesper, Lincoln
George Lee Wingate,	Manhattan, Riley
Adolf Andrew Wirth,	Vesper, Lincoln
Harry Palmer Witham,	Manhattan, Riley
Lenard George Wright,	Arkansas City, Cowley
Robert Rainey Wylie,	Eskridge, Wabaunsee

COMMERCIAL CREAMERY SHORT COURSE

Name.	Post office and county (or state).
Floyd Carl Cragg,	Manhattan, Riley
Charlie Sherman Davis,	Dunavant, Jefferson
John Wesley Hart,	Orland, <i>Oklahoma</i>
James Oscar Jackson,	Enid, <i>Oklahoma</i>
Ivan Erwin Kullman,	Towanda, Butler
Bernard Bruno Ludwig,	<i>Forst, Germany</i>
Jesse Benedict Miller,	Langdon, Reno
Fred Rathbone Oshant,	Hays, Geary
Charles Warren Quinn,	Dwight, Geary
James Vivan Routh,	Hiattville, Bourbon
Chauncey Witeraft,	Fairfax, <i>Oklahoma</i>

Summary of Students, 1912-1913

	Grand total									
	Total.....					Wom-en.				
Miscellaneous.										
Industrial Journalism..						Wo-men.				
General Science.....						Wo-men.				
Home Economics..						Wo-men.				
Printing.....						Wo-men.				
Architecture..						Wo-men.				
Civil Engineering...						Wo-men.				
Electrical Engineering...						Wo-men.				
Mechan. Engineering...						Wo-men.				
Veterinary Medicine....						Wo-men.				
Dairy Husbandry..						Wo-men.				
Animal Husbandry..						Wo-men.				
Horticulture..						Wo-men.				
Agronomy....	Men.	Men.	Men.	Men.	Men.	Wo-men.				
Graduate	24	4	29	4	14	19	15	9	1	109
Senior.....	50	13	29	11	16	19	18	8	1	146
Junior	45	14	37	7	12	28	33	13	5	183
Sophomore.....	88	18	83	1	13	26	48	23	11	34
Freshman 1st.....										136
Subfreshman 1st.....										34
Subfreshman 2d.....										8
Special.....										23
H. E. S. C.....										7
F. S. C. 1st.....										19
F. S. C. 2d.....										8
C. C. S. C.....										1
Summer School.....										1
Totals.....	207	49	128	23	49	82	124	69	41	574
Counted twice.....										100
Net total.....	207	49	128	23	49	82	124	69	41	574

*One woman.

Students by States and Counties, 1912-1913

STATES AND TERRITORIES

Kansas	2,771	Missouri	43
Arkansas	5	Nebraska	15
California	5	New Mexico	8
Colorado	5	New York	3
Georgia	1	North Carolina	2
Hawaii	8	Ohio	3
Idaho	1	Oklahoma	18
Illinois	7	Phillipine Islands	1
Indiana	2	South Dakota	1
Iowa	3	Tennessee	1
Kentucky	1	Texas	10
Massachusetts	1	Utah	1
Michigan	2		
Minnesota	1	Total	2,920
Mississippi	1		

FOREIGN COUNTRIES

Finland	1	Japan	1
Germany	1	Mexico	4
Jamaica	1		
		Total	8

GRAND TOTAL, 2928.

KANSAS COUNTIES

Allen	15	Gray	5
Anderson	23	Greeley	2
Atchison	13	Greenwood	26
Barber	8	Hamilton	1
Barton	88	Harper	15
Bourbon	16	Harvey	30
Brown	24	Hodgeman	2
Butler	23	Jackson	31
Chase	10	Jefferson	25
Chautauqua	7	Jewell	40
Cherokee	3	Johnson	29
Cheyenne	1	Kearny	2
Clark	8	Kingman	12
Clay	37	Kiowa	7
Cloud	36	Labette	19
Coffey	14	Lane	6
Comanche	8	Leavenworth	16
Cowley	34	Lincoln	40
Crawford	7	Linn	18
Decatur	6	Logan	5
Dickinson	60	Lyon	33
Doniphan	11	Marion	31
Douglas	36	Marshall	55
Edwards	7	McPherson	46
Elk	5	Meade	2
Ellis	9	Miami	25
Ellsworth	13	Mitchell	30
Finney	11	Montgomery	20
Ford	13	Morris	23
Franklin	31	Morton	2
Geary	21	Nemaha	27
Gove	6	Neosho	14
Graham	8	Ness	5
Grant	3	Norton	8

KANSAS COUNTIES—concluded.

Osage	35	Sheridan	6
Osborne	24	Sherman	4
Ottawa	13	Smith	27
Pawnee	25	Stafford	33
Phillips	16	Stanton	2
Pottawatomie	37	Stevens	1
Pratt	21	Sumner	14
Rawlins	3	Thomas	8
Reno	42	Trego	11
Republic	33	Wabaunsee	34
Rice	22	Wallace	2
Riley	720	Washington	39
Rooks	13	Wichita	1
Rush	10	Wilson	33
Russell	19	Woodson	24
Saline	38	Wyandotte	64
Sedgwick	74		
Seward	10	Total	2,771
Shawnee	106		

Record of Attendance, 1879-1913

Correspondence Courses

Figure following name indicates the number of courses.

READING COURSES

Name.	Post office and county (or state).
Alfred S. Alberty,	Cherokee, Crawford
Charles Anderson,	Kinsley, Edwards
J. H. Beecher,	Genoa, Nebraska
J. F. Bernard,	Hutchinson, Reno
Floyd Black,	Bern, Nemaha
J. W. Bolton,	Iola, Allen
Henry W. Cox,	Elsmore, Allen
Geo. W. Curtis,	Topeka, Shawnee
Raymond E. Deen,	Andover, Butler
E. L. Dicke (2)	Louisburg, Miami
V. P. Dixon (2)	Linwood, Leavenworth
Fred C. Dymock,	Wichita, Sedgwick
Claude Evans (2)	White City, Morris
Clarence Evans (2)	White City, Morris
Dora Foraker,	Pittsburg, Crawford
C. Edgar Funston,	Lakin, Kearny
Will P. K. Gates,	Wakefield, Clay
James Graybill,	Winchester, Jefferson
G. H. Haines,	Baxter Springs, Cherokee
C. R. Henry,	St. Francis, Cheyenne
Jesse Hill,	Hudson, Stafford
W. W. Hunt, sec. of club	Blue Rapids, Marshall
C. M. Irwin,	Wichita, Sedgwick
Charles Ivey,	Quenemo, Osage
Reuben Johnson,	Clifton, Washington
Myrtle Jump,	Anthony, Harper
G. A. Kibbe,	Cherryvale, Montgomery
R. F. Koontz (2)	Lane, Franklin
Mrs. Alan Laing,	Ames, Cloud
Royal H. Lapworth,	Pittsburg, Crawford
E. C. Lawry,	Carbondale, Osage
J. W. Ledbetter (2),	Canon City, Colorado
H. R. Leland,	Topeka, Shawnee
W. J. Lott,	Junction City, Geary
C. E. McCarty (2),	Dodge City, Ford
Owen McCarty,	Concordia, Cloud
Geo. Mellard (2),	Russell, Russell
W. A. Morgan,	Alta Vista, Wabaunsee
H. A. Nelson, sec. of club	Brookville, Saline
H. H. Newmann, sec. of club	Hanover, Washington
R. P. Nevin,	Pittsburg, Crawford
Blanche P. Peters,	Bucklin, Ford
Peter Peterson,	Falun, Saline
George H. Phinney,	Maxwell, California
Howard Porter,	Washington, Washington
M. D. Powell (3),	Hardy, Nebraska
Mrs. A. B. Randolph,	Arkansas City, Cowley
Sam Regier,	Moundridge, McPherson
Joseph W. Reid,	Kansas City, Missouri
C. E. Rettig,	Chanute, Neosho
Harry Ross,	Bronson, Bourbon

Name.	Post office and county (or state).
Charles Schroeder,	Tully, Rawlins
E. L. Simonton,	Wamego, Pottawatomie
Charles L. Snyder (5),	Hutchinson, Reno
F. H. Tarnstrom,	Lindsborg, McPherson
J. H. Taylor,	Chapman, Dickinson
H. H. Thompson,	Tecumseh, Shawnee
J. L. Trece,	Alma, Wabaunsee
Geo. C. Tredick,	Kingman, Kingman
B. F. Verhage (2),	La Cygne, Linn
Lofton White (2),	Elk Falls, Elk

EXTENSION COURSES

A. L. Anderson,	Leavenworth, Leavenworth
L. Anderson,	Leavenworth, Leavenworth
Ruth Anderson,	Brawley, <i>California</i>
George Arkebauer,	Kanorado, Sherman
Ruth Balderson,	Louisville, Pottawatomie
Tom H. Ballantyne,	Enterprise, Dickinson
Otto C. Balzer,	Inman, McPherson
James Bane,	Logan, <i>Utah</i>
Harry C. Barnett,	San Antonio, Texas
J. W. Barron (2),	Kirwin, Phillips
John P. Barta,	Ottawa, Franklin
Mrs. J. T. Bayer,	Yates Center, Woodson
Charles Beck,	Lansing, Leavenworth
O. R. Becker,	Atchison, Atchison
Percy Blown,	San Antonio, <i>Texas</i>
Frank G. Boone,	Toronto, Woodson
V. V. Bossi,	Arkansas City, Cowley
Carl Broberg,	Vesper, Lincoln
Fred W. Brown,	Sylvan Grove, Lincoln
Thomas W. Bruner (2),	Oanica, Kearny
Ella Burdick,	Emporia, Lyon
George W. Byrns,	Cooper, <i>Iowa</i>
Robert Cahill,	Horton, Brown
Frank Chase,	Iola, Allen
Roy H. Clarke,	Salina, Saline
Grover Collins,	San Antonio, <i>Texas</i>
Carl Cook,	Kirwin, Phillips
Frederick H. Cook,	Kirwin, Phillips
Wm. R. Cook,	Altamont, Labette
Meda Crampton,	Arkansas City, Cowley
Oscar Dahlgren (2),	Clay Center, Clay
E. W. Dales,	Eureka, Greenwood
Earl J. De Long,	Emporia, Lyon
A. C. Dickman,	Fostoria, Pottawatomie
Earl Dixon,	Essex, Finney
Paul A. Drevets,	Smolan, Saline
Roy Ensminger,	Moran, Allen
Harvey Eshelman,	Enterprise, Dickinson
Esther Fieser,	Nashville, Kingman
Eva Fearing,	Burr Oak, Jewell
H. M. Fearing,	Burr Oak, Jewell
Nora Foraker,	Wellington, Sumner
O. T. Franzel,	Atchison, Atchison
Hugh Fuller,	Horton, Brown
W. L. Funk (2),	Raymore, <i>Missouri</i>
C. Edgar Funston,	Lakin, Kearny
James Orris Gitchell,	Little River, Rice
H. P. Goodell,	Hutchinson, Reno

Name.	Post office and county (or state).
Clara Goodrich,	Mankato, Jewell
Gertrude Goodwin,	Macksville, Stafford
R. H. Graham,	Salina, Saline
J. S. Grove,	Kansas City, Missouri
Elmer R. Hart,	Coffeyville, Montgomery
Wilburt Hart,	Liberty, Montgomery
John A. Harvey,	Ogden, Riley
R. K. Heagler,	Ellinwood, Barton
E. E. Heaps,	Parsons, Labette
Mrs. P. F. Hederhorst,	Stockton, Rooks
Harry Heltemes,	Hosington, Barton
Clyde E. Horn,	Stafford, Stafford
Jennie G. Houdik,	Cuba, Republic
John Horrigan,	Topeka, Shawnee
Richard F. Hulland,	Rosedale, Wyandotte
Gertrude Hymer (2),	Belle Plaine, Sumner
W. L. Jacobs,	Great Bend, Barton
H. C. Jent,	Wamego, Pottawatomie
Sophus Johnson (2),	Hays City, Ellis
G. H. Judd,	Bigelow, Marshall
Emil Kaaz,	Atchison, Atchison
C. L. Kellenberger,	Bern, Nemaha
Rex Kemper,	Hosington, Barton
George Kershner,	Hutchinson, Reno
Howard Kissinger,	Ransomville, Franklin
Margaret Klassen,	Inman, McPherson
Ira T. Koogle,	Chapman, Dickinson
R. F. Koontz,	Lane, Franklin
Edith M. Lamb,	Alamota, Lane
J. C. Laney,	San Antonio, Texas
Anna M. Larson,	Lindsborg, McPherson
C. E. Lindeman,	Salina, Saline
Jean Lightner,	Bucklin, Ford
Charles H. Loomis (2),	Merriam, Johnson
Harry W. Lukens,	Highland, Doniphan
B. C. McClelland,	Milo, Lincoln
R. S. McElwain (2),	Lyons, Rice
J. B. McFarland,	Chanute, Neosho
Harry S. McKay,	Parsons, Labette
C. W. McKeage,	Hoyt, Jackson
T. H. McKittrick,	McCracken, Rush
A. W. Matthies,	Buhler, Reno
W. H. Maxwell,	Topeka, Shawnee
Blaine Monroe,	Lansing, Leavenworth
Chester H. Moon,	El Dorado, Butler
Ray E. Morrill,	Summerfield, Marshall
T. J. Mullins,	Junction City, Geary
H. F. Morsbach,	Medicine Lodge, Barber
H. A. Nelson,	Brookville, Saline
J. E. Nicholson,	Atchison, Atchison
Ray Nigus,	Hiawatha, Brown
E. H. Norris (2),	Clafin, Barton
Frank Oaks,	Lansing, Leavenworth
Leonard Pacey,	Miltonvale, Cloud
Murvale E. Parnell (2),	Haviland, Kiowa
Mrs. Mary E. Phillips,	Kinsley, Edwards
Geo. H. Phinney,	Maxwell, California
Harry A. Poling,	Milwaukee, Wisconsin
Frank W. Pollock,	Lansing, Leavenworth
Lem R. Raley,	Lansing, Leavenworth

Name.	Post office and county (or state).
John M. Rankin,	Kansas City, Wyandotte
William E. Ready,	Lansing, Leavenworth
C. E. Rettig,	Chanute, Neosho
Mrs. T. F. Rhodes,	Frankfort, Marshall
James Richardson,	Lawrence, Douglas
G. O. Roos,	Kankakee, Illinois
Hall Rumble,	Chanute, Neosho
W. E. Russell (2),	Oak Valley, Elk
Edna Sable,	Argentine, Wyandotte
U. S. Sandlin,	Ashland, Clark
Fred A. Scheetz,	Clayton, Norton
W. Acy Schraeder,	Kansas City, Missouri
Charles Schroeder,	Tully, Rawlins
C. B. Shirlock,	Lansing, Leavenworth
Elmer E. Short,	Topeka, Shawnee
Paul F. Shuck,	Greensburg, Kiowa
Laura Siegrist,	Simpson, Mitchell
Cecil Smith,	Cruce, Oklahoma
J. P. F. Smith,	Kansas City, Wyandotte
B. W. Snyder,	St. John, Stafford
Mabel Glenn Snyder,	Bucklin, Ford
Alvah Souder (2),	Newton, Harvey
James Stratzter,	Parsons, Labette
Walter Stewart,	Lansing, Leavenworth
H. M. Stewart,	Alden, Rice
Mrs. Florence Stephens (2),	Lucas, Russell
Mrs. E. N. Stites,	Hope, Dickinson
John D. Steinbrink,	Warm Springs, Oregon
Sterling Russell Stover,	Iola, Allen
Leonidas Swaim,	Port Gamble, Washington
V. R. Tate,	Atchison, Atchison
Mrs. R. W. Titus,	Galena, Cherokee
Mrs. C. W. Thompson,	Burden, Cowley
H. H. Thompson (2),	Tecumseh, Shawnee
Earl W. Tracy,	San Antonio, Texas
George C. Tredick,	Kingman, Kingman
E. H. Todd,	Salina, Saline
Edna Ullom,	Paola, Miami
Susie Unruh,	Goessel, Marion
William L. Vincent,	Hoisington, Barton
A. G. Vinson,	Alva, Oklahoma
Laura B. Weickert,	San Bernardino, California
I. J. Wenger,	Aberdeen, Idaho
Peter Werner,	Tecumseh, Shawnee
Ralph White,	Hoisington, Barton
John R. Williams,	Wellsville, Franklin
S. R. Winsor,	Wakefield, Clay
W. H. Wolcott,	Parsons, Labette
Mrs. G. M. Woodhead,	Lawrence, Douglas
B. H. Wright,	Ottawa, Franklin
J. M. Zerbe,	Syracuse, Hamilton

CREDIT COURSES

Clarence T. Anwick,	Arcata, California
Elsie Arbuthnot,	Cuba, Republic
J. H. Beecher,	Genoa, Nebraska
Floyd Black,	Bern, Nemaha
Thos. W. Brephy,	Lansing, Leavenworth
Fred Carp,	Wichita, Sedgwick
Hattie Cleavenger (2),	Linwood, Leavenworth

Name.	Post office and county (or state).
George W. Curtis,	Topeka, Shawnee
Alex E. Davis,	Belleville, Republic
Harry D. Dunavan,	Kansas City, Missouri
Fred R. Eastman,	Matfield Green, Chase
E. H. Fenton,	Kansas City, Missouri
S. E. Ferguson,	Mullinville, Kiowa
Frank J. Fisher,	Horton, Brown
John J. Fowler,	Jewell City, Jewell
Peter A. Friesen,	Burton, Harvey
Samuel H. Garekol,	Katanot, New York
Roy W. Gates,	Pittsburg, Coffey
M. M. Grabosch,	Esbon, Jewell
R. W. Getty,	La Harpe, Allen
Mrs. Ida Givens,	Butler, Indiana
C. W. Howard,	Colby, Thomas
Gilford Ikenberry (2),	Quinter, Gove
Morris James,	Gridley, Coffey
O. H. Johnson,	Cloquet, Minnesota
Alice M. Kiehl,	Ottawa, Franklin
E. W. Kiebler,	Scottville, Michigan
Mildred Kirkwood,	Marysville, Marshall
Erma Locke,	Phillipsburg, Phillips
F. D. McClure,	Jewell City, Jewell
Claud McCormick,	El Dorado, Butler
Vesta McCune,	Benton, Butler
Harvey Marsh,	Kansas City, Wyandotte
R. W. Mitchell,	Albany, Missouri
J. C. Mohler,	Topeka, Shawnee
Flora H. Morton,	Renfrow, Oklahoma
Alex T. Nelson (2),	Phoenix, Arizona
William Nesbit,	Lansing, Leavenworth
Eulalia Nevins (2),	Dodge City, Ford
Guy C. Omer,	Paola, Miami
I. D. Phillips (2),	Kinsley, Edwards
W. E. Phillips,	Ashland, Clark
Edna Pugh,	Junction City, Geary
E. C. Rath,	Cuba, Republic
E. B. Redman,	Eureka, Greenwood
John Rieth, Jr.,	Wilsey, Morris
Mary Robson,	Leroy, Coffey
B. H. Rouse,	Atwood, Rawlins
Gabe Sellers,	Great Bend, Barton
Roscoe R. Simon,	Soldier, Jackson
L. W. Stricker,	Luverne, Minnesota
Cecil Smith,	Cruce, Oklahoma
F. P. Strickland, Jr. (2),	Kansas City, Wyandotte
E. H. Todd,	Salina, Saline
Frank Van Haltern,	Winslow, Arkansas
George Votaw,	Eudora, Douglas
Burt W. Welsh,	Newton, Harvey
Amelia Wheeler,	Manhattan, Riley
Curt K. Whitney (2),	Rossville, Shawnee
Charles T. Wilkes,	Iola, Allen
John B. Wise,	Clearwater, Sedgwick
C. C. Wright, Jr.,	Kansas City, Wyandotte

CORRESPONDENCE COURSE STUDENTS—SUMMARY

Reading Courses:

Alfalfa	8
Breeds of Horses.....	1
Breeds of Cattle.....	1
Canning and Preserving	2
Care of Children.....	1
Corn	3
Dry Land Farming	3
Farm Dairying	2
Hog Raising	5
Home Decoration	2
Incubating and Brooding.....	1
Injurious Insects, Garden.....	1
Injurious Insects, Orchard.....	2
Orcharding	8
Poultry Disease Prevention.....	2
Poultry Feeding and Housing.....	6
Sanitation and Health	1
Sheep Raising	1
Silos and Silage	7
Soils	15
Sorghum Crops	1
Stock Feeding	2
Study of Child Life.....	1
Tree Planting	1

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Extension Courses:

Animal Breeding	7
Automobiles	15
Blacksmithing	1
Carpentry and Building	7
Concrete Construction	6
Cookery I	17
Dairy Manufacturing	7
Drawing for Sheet Metal Workers.....	3
Elementary Architectural Drawing.....	8
Farm Blacksmithing	1
Farm Buildings	3
Farm Dairying	4
Farm Machinery	3
Forestry	2
Gasoline Engines	4
Gasoline and Kerosene Traction Engine.....	11
Highway Construction	1
Insects Injurious to Farm Crops.....	2
Insects Injurious to Orchard Crops.....	1
Landscape Gardening	4
Machine Shop Work	4
Pattern Making	1
Plumbing	1
Sewing I	12
Shop Mechanical Drawing	9
Shop Mathematics	13
Soils	8
Steam Boilers and Engines.....	2
Steam Traction Engines.....	4
Stock Feeding	10

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Credit Courses:

Algebra I	1
Algebra II	1
Elementary Agriculture	15
English Classics	7
Farm Crops I	11
Floriculture	1
Forage Crops	1
Geology	1
Geometrical Drawing	2
Geometry, Plane, I	3
History of Education	9
Manual Training Drawing I	1
Mediæval History	1
Methods of Teaching	1
Modern History	1
Philosophy of Education	1
Poultry Management	4
Qualitative Analysis	1
Rural Sociology	2
Sociology	1
Vegetable Gardening	1
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Total number of enrollments	311
Number enrolled in more than one course	41
Number of students enrolled	276

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